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A Student-Driven Guide for Project-based Learning

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A STUDENT-DRIVEN GUIDE FOR PROJECT-BASED LEARNING

by

Michael Driscoll Lee Driscoll, Jr.

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A STUDENT-DRIVEN GUIDE FOR PROJECT-BASED LEARNING

by

Michael Lee Driscoll, Jr.

The University of Wisconsin-Milwaukee, 2020
Under the Supervision of Professor Kimberly J Cosier, PhD

This action research study proposes the need for and examines the usefulness of a Student-Driven Guide for Project-Based Learning. The Guide was designed to give students guidance and structure in carrying out and documenting a project as a part of a class, or when students are working independently from a teacher. The Guide was informed by the educational theories of Constructionism, Student-Driven Learning and Cross-Disciplinary Learning. It was tested with a group of high school students who used the Guide to create a series of multimedia photography projects. Completed Guides and student surveys about the experience were then collected and analyzed to determine if the Guide was useful to students and how it might be improved to better support student performance in the future. The findings of the study include data on positive and negative student engagement with the PBL Guide, areas of the Guide that need to be reviewed, student struggles with conceptual writing, and overconfidence in final student outcomes. The study concludes that the PBL Guide is helpful to students in an organizational capacity but needs further iterative changes to improve its effectiveness. These changes are addressed using action research methods in the form of a revised mockup for a digital PBL Guide that other researchers have the opportunity to build on in the future.

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Dedicated to the human nagging collective...
The family, friends, and teachers who pushed me
when I felt like giving up.

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Chapter 1. The Problem

1.1 Introduction

Imagine for a moment that you are a teacher who has been placed into a high school classroom that contains a highly diverse group of students. These students include Freshmen, Sophomores, Juniors and Seniors. They come from a variety of races, cultures, socio-economic backgrounds, and living situations. Some students come from families that are financially stable, and others face the stresses that come with having a lack of financial resources. Some students have more cultural capital passed down to them than others (Bourdieu & Passeron, 2014) allowing them to understand how to work within systems and structures. Some students face challenges, including a lack of safety or support at home, or issues finding enough food on a weekly basis. This creates a significant disadvantage in their ability to prioritize learning above more basic needs (Maslow, 2013). Some students come into the classroom with an astute understanding of how to study, learn, and be self-motivated in school. These students would be successful in nearly any learning environment and retain knowledge because they see its implicit benefit to their lives.

On the flip side, some of your students have been pushed through the system from one grade to the next with little evidence that they have improved their academic skills. They struggle with basic reading, writing and math skills. Many are unmotivated to perform, some may have emotional or cognitive disabilities, severe depression or drug addiction. Many currently lack basic skills for using technology and struggle with developing methods for problem solving or conducting research. Considering this

incredibly wide range of ability levels and situations, is there a single learning structure that would be beneficial to all of these students in a mixed age level classroom? How could this enormous range of needs be effectively addressed?

This is the question that I began asking myself in September of 2017, while in the process of helping launch a new public charter school in Milwaukee, Wisconsin. Upon signing on with the school, I don't think any of the staff realized just how monumental a task we had taken on. From the school's conception, the staff shared the core beliefs that it would be a project-based high school, with an individualized learning plan for every student and intentional ethnic, socioeconomic, and gender diversity within its student body.

One thing we had not expected was the extremely wide range of academic abilities our students would have. Initially the school was conceived as having four major projects a year that would tie together standards from the humanities, math, science, engineering and the arts. This proved to be logistically complicated. Trying to create a set of projects that was engaging and meaningful to all students, that was also adaptable for different learning styles and levels, and addressed the standards of each class in a logical order was challenging. After the first few weeks of school and many conversations, the teachers realized that this structure was not going to work for many of our students. Many of the components of the projects were often overly complicated for our lower achieving students or they weren't challenging enough to keep our high performing students interested. For some, the content was something they just didn't find interesting or applicable. Instead what was needed was more individualization,

allowing the students to take charge of their own learning. By shifting to a student-centered learning approach (Estes, 2004; Jones, 2007; Weimer, 2002) a self-regulated learning environment could be created that could solve many of the struggles that students were having. According to Zimmerman (1989), a self-regulated student can be defined as:

Metacognitively, motivationally, and behaviorally active participants in their own learning process...[who] personally initiate and direct their own efforts to acquire knowledge and skill rather than relying on teachers, parents, or other agents of instruction...students learning must involve the use of specific strategies to achieve academic goals on the basis of self-efficacy perceptions. (p. 329)

Zimmerman's mention of specific strategies is something I found particularly interesting as an essential piece that was missing for many of our students. Students needed a simple format or structure that would help them create projects that were meaningful, engaging, and appropriate for their academic level even when direct assistance wasn't available. Zimmerman and Martinez-Pons (1986) offer this idea about how such a format or structure might be constructed:

Self-regulated learning strategies are actions and processes directed at acquiring information or skill that involve agency, purpose, and instrumentality perceptions by learners. They include such methods as organizing and transforming information, self-consequating, seeking information, and rehearsing or using memory aids. (p. 615)

These tenets of student agency and purpose, as well as methods including the organization and documentation of collected information and the ability for students to drive learning made a lot of sense to all of the teachers at my school, so this is the direction we began to transition our classes to.

Unfortunately, one of the things the teachers noticed right away was that even though students were trying to take on substantial projects, they struggled to document their learning in a way that was useful when presenting their work at the end of a project. Their ideas were scattered, confusing, sometimes lacking in depth or planning, and in need of organization.

1.2 Problem Statement

After seeing the type of process work my students were creating and collecting, I began to consider what might empower them to plan and engage in complex projects more easily. I came up with the idea of creating a Student-Driven Guide for Project-Based Learning that was easy to understand and use across a range of abilities and content areas. I felt that this could give students the guidance and structure they needed to be more self-sufficient when creating projects from beginning to end, giving students context and outlining next steps even when a teacher wasn't available. It would also allow me to fulfill the role of project manager and collaborator more effectively, because my time could be spent helping find students better resources and giving personalized advice instead of directly instructing students about project structure or documentation. This would allow students the opportunity to explore, make mistakes,

make discoveries, learn, research, and iterate at their own pace; self-selecting content that was interesting and appropriate to their preferred learning styles.

The Guide needed to be robust enough to satisfy teaching standards, but still be simple and intuitive to follow for students. Before I began creating this Guide I researched to see if something like it already existed that I could simply adapt for our needs. During my search, I found little that was designed for direct use by self-regulated students that wasn't simply a vague set of steps without direct explanation on how to engage with it. Examples of these student facing guides include Lathram, Lenz, & Ark (2016), "Learning in a Project-Based World; A quickstart guide for students" (retrieved from <http://tiny.cc/StudentQuickGuide>), and the Buck Institute for Education (2019), "Project Work Report: Individual" (retrieved from <http://tiny.cc/ProjectWorkReport>). By contrast, guides for teachers about Project-Based Learning were too complex and institutional in their language and presentation to be used effectively by students. Examples of these kind of guides include the National Academy Foundation and Pearson Foundation, "Project-Based Learning Guide; A Resource for Instructors and Program Coordinators" (2006), (retrieved from <http://tiny.cc/pblguide>), and Patton (2012), "Work That Matters; The teacher's guide to project-based learning" (retrieved from <http://tiny.cc/WorkThatMatters>).

Based on the lack of comparable tools found during my search, I came to believe that the creation and testing of a Student-Centered Guide for Project-Based Learning would be a meaningful tool to add what is currently unavailable. The end product would have the potential to benefit a wide range of students across many disciplines if it

proved to be successful. When building the concept for my Guide I considered what form it should take and concluded that it would be the most effective if made into an interactive digital online space for students to develop, showcase, and get feedback on projects. Unfortunately, my skill-set, available timeline, and resources precluded that possibility at that time. So, I decided to instead embrace the PBL concept of rapid prototyping and create a simple paper-based model for the purposes of this thesis, to see if the idea was worth pursuing further, and to see what parts of the Guide are useful for its intended student audience. I thought that if the initial pilot should be even partially successful, this research could eventually be expanded and adapted for use at different age levels and iterated into a computerized program for more efficient tracking of student learning outcomes.

Adding to my initial challenges, after the original idea for the development of my Learning Guide began to form, a staffing crisis occurred at my original school and I had to transition to a new role in 2018 as a digital art and design teacher at a high school in a nearby suburb of Milwaukee. This meant that my test group ended up being a different population than originally planned. Although this change occurred, the Guide's original inspiration was to make it as flexible as possible to benefit many different project types and learner groups, so the change did not prohibit me from continuing the study.

Wisconsin Department of Public Instruction's School Report Card for 2019-2019 (retrieved from <https://apps2.dpi.wi.gov/reportcards/>) indicates that the ethnic demographics of students at my school were: 65.07% White, 22.10% Hispanic/Latino,

5.30% Black, 3.90% Asian, .30% American Indian or Alaskan Native, .10% Native Hawaiian or Other Pacific Islander, and 2.70% who identified as Two or More races. Also the data indicated that 13.70% of students had disabilities, 31.80% of students were economically disadvantaged, and 5.60% of students had limited English Proficiency. Similar to the group of students who inspired the Guide, the students at my new school came from a wide range of socio-economic backgrounds and living situations. They also struggle with many of the same issues of depression, anxiety, lack of stable home lives, etc., creating a diverse population of learning styles and abilities.

Because I believe in research that yields action and tangible end results and because I am interested in how these Guides will impact my teaching and my students' learning, my thesis is framed as action research. The project will be broken down into the following steps:

1. A review of research about theories and best educational practices surrounding Project-Based Learning
2. A review of how research impacted the development of my PBL Guide.
3. A review of the methods used to collect and interpret data.
4. A reflection and analysis of the effectiveness of the PBL Guide based on student feedback, the filled out PBL Guides, and final student projects.
5. A reflection on how the Guide could be adapted and refined in the future and how it has affected my role as an art educator.

1.3 Statement of the Research Problem

This research study was conducted as an attempt to create an effective structure to help a wide range of students develop independent projects that incorporate personal interests. The question that I endeavor to answer with this research project is: Does *the*

Student-Driven Guide to PBL help students create, track, improve, and reflect on a project that they develop themselves?

Chapter 2. Conceptual Framework and Literature Review

I will begin my literature review by exploring various concepts relevant to the creation, implementation, and study of my action research project. Major themes that will be covered include beliefs on how students learn most effectively by making things, individualizing content to student interests, how projects are conceived, constructed, and tracked, as well as why students should be the driving force for their own educational journey. These themes were important in clarifying my understandings and reasoning for engaging in this project and will clarify for readers exactly what I mean when discussing elements of the action research project. I will then look at and discuss how this research directly influenced components of my Project-Based Learning Guide.

2.1 Constructivism and Constructionism

Constructivism is the theory proposed by Jean Piaget (1936, 1958) that knowledge is actively constructed in the mind of a learner by augmenting new ideas with past experiences. In developing this theory Piaget demonstrated that intelligence was not predetermined for an individual, but rather developed over time and through specific stages. This act of building new ideas using a combination of new and past experiences would be built upon in later years by a variety of educational scholars including Seymour Papert (1991).

In his theory of Constructionism, Papert proposed that learning is most impactful when created during the construction of a product that is meaningful to the maker and then presented to a wider audience (Papert & Harel, 1991). By taking the basis of idea creation and considering how this process could be optimized for the greatest impact, Papert introduced the ideas of *Individualization* and a *Presentation of Learning* (POL) into the educational zeitgeist. These two ideas when considered together build a context that shows students will learn and retain active experiences where they have participated in the building of knowledge rather than passively receiving information.

2.1.1 Individualization

When considering what individualization really meant I looked for a broad definition that was as student-centered as possible. Flachmann (1994) describes individualization like this:

The oracle, the locus and ownership of knowledge, should reside in each student and our principal goal as teachers must be to help our students discover the most important and enduring answers to life's problems within themselves. Only then can they truly possess the knowledge that we are paid to teach them. (p. 1-2)

The majority of U.S. schools currently approach individualization as accommodations to assist students in special education and those that struggle academically. These accommodations can take many forms, including extra time for projects and assessments, special seating assignments, or texts being read aloud. Efforts to document individualization usually take the form of an individualized learning plan or

ILP. An individualized learning plan or ILP is also referred to as an individual education plan or IEP.

An ILP is a plan, program or guide that is constructed primarily by the learner with the assistance of teachers and other specialists as a way of setting goals and tracking if they have been met, and then reflecting on the process. It can also be used by teachers as a way of tracking what motivates or triggers a student, in an effort to reduce negative reactions to stimuli, and promote positive ones. “An ILP serves as an action plan to direct learning” (Lockspeiser, Kaul, 2016, p. 214-217). At its essence it allows all learners to find what is successful for them, rather than relying on a one size fits all model in which a student must adapt to the method at hand.

Though formal ILP’s are usually reserved for a small percentage of a school’s population, using individualization to help all students be more successful is an important idea that teachers should consider when teaching student centered classes. It is only by getting to know students, their interests, goals, and gaps that you can truly provide the most effective learning environment for every student. Also, students themselves can and should be an integral part of developing an ILP. This allows student voice in how they feel that they learn best, and the development of a self-awareness of their learning habits.

2.1.2 Presentation of Learning (POL)

Throughout the process of creating a project, both in early concepting and research stages, and also later in the construction of a final product or learning artifact, various types of learning occur. When giving a final presentation however, It is not

simply enough for a student to explain to the teacher what they made for a final product because this does not consider the why and how behind the product that was created. It lacks authenticity and a broad audience to critique and question what was presented. This is why a final presentation of learning or POL is an important part of the process. About POL's Patton (2018) says:

Effective POLs include both academic content and the student's reflection on their social and personal growth. They are important rituals – literally “rites of passage” for students...POLs happen in front of an audience that includes their teachers, parents, and peers. By requiring students to present to an audience, reflect on their learning, and answer probing questions on the spot, we are helping students build skills that they will use for the rest of their life. Taking an exam, on the other hand, is a skill that students will rarely, if ever, need to utilize after they finish college. (para. 1-2)

By making a POL, students demonstrate an understanding of their entire process and the paths taken to reach their product. They engage in a discussion with the audience about their choices, offering the presenter the chance to process and synthesize their learning, which sets them up for greater success in the next project that they undertake.

2.2 Linked Educational Philosophies

Constructivism and constructionism have also spawned many linked philosophies and movements over the years, that all owe their core ideals to Piaget and Papert, but emphasize different areas of importance, including developing a curiosity mindset, project development, and student-driven learning.

2.2.1 Developing a Curiosity Mindset

Educational movements that focus on curiosity as the driving force behind what a learner explores include The Maker Movement (Hatch, 2014; Martinez, Stager, 2019), Tinkering (Wilkinson & Petrich, 2017), Discovery Learning (Hermann, 1969), and Deschooling (Weiner, 2016). These movements stress a mindset more than a formal structure, stemming from how people learn outside of formal school settings.

In his book *Getting Started with Arduino*, Massimo Banzi (2015) describes tinkering like this:

Tinkering is what happens when you try something you don't quite know how to do, guided by whim, imagination, and curiosity. When you tinker, there are no instructions – but there are also no failures, no right or wrong ways of doing things. It's about figuring out how things work and reworking them. Contraptions, machines, wildly mismatched objects working in harmony – this is the stuff of tinkering. Tinkering is, at its most basic, a process that marries play and inquiry. (p. vi)

This sense of learning through play can also be found in the beliefs of Australian philosopher Ivan Illich (1971) who sought to untether the educational objects used by schools from formal educational experiences in an effort to allow students to explore based on their natural curiosity. In his book *Deschooling Society*, he envisions spaces with a variety of tools and equipment where students could observe, experiment, and explore whatever interests them. Along with this he advocates for the concept of “Skill Exchanges”, where the skills and knowledge of all are valued, not just the skills of

professionals. He says of this concept that “education for all means education by all” (Illich, 1971, p. 12), and he even describes the use of tutorials like one might find today on websites such as youtube.com or instructables.com.

In *The Learner-Directed Classroom: Developing Creative Thinking Skills Through Art* (Jaquith, Hathaway & Fahey, 2012), George Szekely discusses another subject connected to developing curiosity through a state of play. He says that:

Artists of all ages explore the world through play and art... Play is a means of interacting with objects and forms, testing materials, experiencing surfaces, exploring spaces. In play children create manageable models of the world so they can make modifications and restructure what exists. Play allows for independent exploration and creates avenues to see things in fresh ways, to discover, to invent. (p. 64)

It is this sense of play, curiosity, experimentation, and exploration that I would like to imbue in my student Guide, giving students the opportunity to lead their own learning based on personal interests.

2.2.2 Project Development and Project-Based Learning

Educational movements that focus on the creation of project structures include Project-Based Learning (PBL) (Larmer, Mergendoller, & Boss, 2015) and Design Thinking (Kelley & Littman, 2016). Project-Based Learning (PBL) stresses the acquisition of knowledge through action (Barnes, 1988). Whereas past methods of learning may have situated learners as passive receptacles for knowledge, passengers in a car with a set destination in mind, effective PBL places the learner as the driver of

the car, asking them where they would like to go and how they intend to get there. Students get to engage in learning by the act of creating rather than simply listening, discussing or taking notes. Also, PBL is not simply the act of completing a prescribed project with an end objective in mind, but allows for the use of structured thinking, problem-solving, research, decision making, unexpected outcomes, failure, complexity, iteration, and reflection about the process.

Design thinking refers to the process that designers often go through to discover and solve problems associated with end users. It involves a set of iterative steps that vary in number and sequence, but according to one of the pioneers of the movement, Stanford's d.school, steps usually include "empathize, define, ideate, prototype, and test". These steps have been used to great success by huge companies like Google and Amazon. Teaching the steps to students allows them to gain a broader understanding of their own learning and also realize how the products of their learning can be continuously improved. Design thinking and PBL are interlinked in that, conscious of it or not, learners engaged in the creation of a project or product eventually end up utilizing the processes of design thinking. Being able to put a label to the stages only clarifies the direction and intention that a learner needs to follow in order to find success.

In a review on research about PBL, Thomas (2000) offers the following five criteria to decide if a PBL pedagogy is truly being used:

- [1.] PBL projects are central, not peripheral to the curriculum....[2.] PBL projects are focused on questions or problems that "drive" students to

encounter (and struggle with) the central concepts and principles of a discipline...[3.] Projects involve students in a constructive investigation...[4.] Projects are student-driven to some significant degree...[5.] Projects are realistic, not school-like. (p. 3-4)

These criteria are a good litmus test to see if you are in-fact teaching using PBL or simply have created projects that act as “enrichment” to a more primary lesson that you are teaching in a more traditional manner. The important factors here are that the project is primarily driven by students from beginning to end, and that the project is as “real world” as possible. Incorporated in these rules is a focus on students learning through curiosity and the creative thinking process.

I would also argue that PBL requires an essential 6th criterion, in that the students that engage in it are reflective about what they are learning and why. This reflection will usually pertain to formal and informal research which students are conducting and the related or parallel knowledge acquired during the process of researching. However, reflection might also extend to a consideration of why a learner is interested in a certain concept, and how it relates to their lives, as well as their motivations as a person. This therefore links Project-Based Learning with the end goals of programs such as democratic education and critical pedagogy, where the goal of learning is to discover one’s true self and place in society.

2.2.3 Student-Driven Learning

Educational Movements that focus on each individual student’s needs and goals include student-driven education also called student-centered education, and

democratic education. A student centered educational practice revolves around the concept that students who are intrinsically motivated to learn sustain that practice over the long term rather than completing educational tasks for the sake of acquiring a credential that advances them forward in the educational machine. I like to refer to this process as student “driven” because it not only puts students at the center of how a teacher plans a classroom, but sets them up as the ones driving their own educational goals. By changing this syntax, students are given the responsibility for deciding where they go on their educational journey, how they get there, and how long that journey should last. Setting up a class that uses a truly student-driven approach means discussing with students why this change is occurring and how it will benefit them.

In Lion Gardiner’s, *Why We Must Change: The Research Evidence* (1998), he stresses:

If our students do not understand the learning process—the chief engine of education—they are not going to learn very much in our courses no matter what we do. One of the most valuable actions we could take to improve learning—and thus the productivity of both our students and our institutions— would be to teach our students how to learn. (p. 77)

In a student-driven classroom teachers take on the role of facilitators and collaborators rather than the primary source of knowledge. Students are asked to conduct research, discuss ideas with their peers, experiment and take risks. This contrasts to the traditional learning experience where students are presented facts by an “expert” and then asked later to recall or use these facts. In a learner centered experience students

propose projects and concepts and work to prove or disprove them, rather than having content and expectations for products overtly dictated to them from the outset. Because this structure relies on the antithesis of the traditional teacher lead classroom, instead giving students reign over content, it is necessary to provide a way to guide learners in their consideration of deep questioning structures both about what they are exploring and how they are exploring. On this idea Olivia Gude (2007) says:

An art curriculum is not a mere container of aesthetic and cultural content; a curriculum is itself an aesthetic and cultural structure. Students should be able to sense, examine, and explain the structure of the art curriculum; these explanations should emphasize important ideas and themes associated with traditional and contemporary artmaking practices. (p. 6)

This means that not only should students decide the content, but also raise questions to be answered by what they discover, and be able to verbalize how the structure they are choosing to follow connects with a wide range of other topics and ideas. In doing this they practice both academic and cultural cross-disciplinary learning.

Democratic education (Rietmulder, 2019) takes this idea one step further, putting students completely in charge of how they use their time, if and what they explore, how they document and use that exploration, and the expectation that they defend their actions as meaningful and deserving of merit to the school as a community. This mirrors how one might have to address a constituency within a democratic government. Students even organize their own classes with students that have similar interests,

choosing teachers to act as guides and mentors in curating a subject for digestion. Likewise, teachers are hired and renewed based on a vote of the members of the school, including all students.

2.3 Cross-disciplinary Learning

A project that is student-driven will very commonly involve many different disciplines, because there is no benefit for them to artificially limit or constrain a project to a certain discipline. Curiosity and exploration lead down a variety of rabbit holes, and students who are given the latitude to dig deeper into areas of interest, learn how to make connections between disparate things more effectively, a cornerstone of creative thinking and problem solving (Thomas, 2013). By asking students to document or track how science affects design, or how English and Math are intrinsically coupled with a real-world project like starting a business, we show students the worth in subjects that they might otherwise discount because they see no value in them. Cross disciplinary learning is also referred to as cross-curricular competencies, and research around this idea is an important part of a long-standing debate in educational psychology between two camps. One group argues that learning is concretely joined with the experience where it was learned and fails to allow for a learner to use that knowledge in foreign situations. This is known as the situated learning paradigm (Hatano & Greeno, 1999). The other theory is that knowledge learned in one instance can be transferred and applied to learning in other situations. The latter is the theory that is tied specifically to cross disciplinary learning. (Neuenhaus, Artelt, Lingel, & Schneider, 2011). By encouraging students to use skill transference we open them up to a wide range of new

interests and understandings of how the world actually operates and the interlinked skills needed to be successful in our modern society.

2.4 Action Research Project Conceptual Framework

Through the examination of relevant theories and ideas, I developed and refined my Student-Driven Guide for Project-Based Learning. I tried to base its various parts on best practices within current educational research, which have been reviewed above. I also showed the document to many other educators and asked for feedback about how the document might be improved. How these ideas and theories have influenced the document include:

2.4.1 Integration of Constructivism

This educational philosophy was used to craft many of the ideation approaches within the Guide including the prompt, remix, and interest-based approaches.

2.4.2 Integration of Constructionism

This educational philosophy became the driving force behind the entire Guide. I worked to make the Guide an active process, instead of a passive worksheet. The Guide asks and also models examples of many questions. Students must ask and answer these questions for themselves specific to the project they are developing. Students can think of the different parts of the Guide like points of interest on a trip, going to see the ones that make sense to them based on the experience they want to have.

2.4.3 Integration of Individualization

There are many opportunities to develop unique projects with or without limitations in the ideation stage of the document. Students also are encouraged to refine their project

using personal influences and research. Finally, students will each record a unique account of their experience developing the project in the reflection stage.

2.4.4 Integration of Presentation of Learning

The document overall acts as a space to record your overall process, revealing patterns of thinking and gaps for further exploration. Students fill in the relevant parts of each stage, and in the end have a viable record demonstrating how they got from A to B.

2.4.5 Integration of Developing a Curiosity Mindset

By not over-limiting what students can research or create but giving them many ways to reach a custom end result, students can explore interests in a freeform manner.

2.4.6 Integration of Project Development

The Guide aimed to teach students one structure for getting from A to B that can be non-linear in form but has stages students can use even when they don't have a paper template present. Stages can be skipped or done out of order depending on what the project calls for.

2.4.7 Integration of Student-Driven Learning

Students can pose questions, identify problems to be addressed or use personal interests as a starting point for their project and incorporate related personal influences and methods as they see fit. They are also responsible for all stages including tracking progress, presenting and documenting final work, and reflecting on projects. This allows students to drive a project and assess its success rather than having a project be teacher led.

2.4.8 Integration of Cross-Disciplinary Learning

All projects are unique in the skills sets required to complete them, and this document has multiple stages that are flexible in allowing for many different types of information from multiple disciplines. Some of these include documenting influences, new vocabulary/discipline specific terminology, and tools/materials needed. The assessment stage of the document has been developed using the national art standards, however they have been re-written to use more general project-based language. The final document (see Appendix A) strives to present many opportunities to students, while keeping each stage as cleanly presented and easy to follow as possible. This document was used in a photography class but could potentially be used in any Project-Based Learning environment.

Chapter 3: Methodology

3.1 Action Research Methodology

The critical question that I endeavor to answer with this research project is; *Does the Student-Driven Guide for PBL help students create, track, improve, and reflect on a project that they develop themselves?* This research study was conducted as an attempt to create an effective structure to help a wide range of students develop independent projects that incorporate personal interests.

To accomplish this, I employed an action research methodology. O'Leary (2007) describes action research as "Research strategies that tackle real-world problems in participatory, collaborative and cyclical ways in order to produce both knowledge and

action” (p. 2). Considering this definition, I designed my process to choose a problem that I had experienced first-hand, built a potential solution to engage that problem, and then tested it with participants that had the potential to make positive gains from its use. After the solution was tested, that data was collected, reviewed, coded with an Inductive coding framework (O’Leary, 2007, p. 7), and analyzed to determine how the tested solution could be improved. I continued with an inductive research approach to analysis because of its flexible iterative nature, which aligns well within action research methodology. Then, I used what I learned from this process to redesign and improve my initial solution.

The elements of the action research process include, 1) Finding a problem, 2) Researching the problem 3) Developing a potential solution, 4) Enacting a solution, 5) Observing the results of the solution, 6) Reflecting on the results, and iteratively improving the original solution. After laying out and reviewing this process I considered how similar this was to basic self-reflective inquiry, leading me to this slightly varied explanation of action research by Wilfred Carr and Stephen Kemmis, (1986):

Action research is simply a form of self-reflective inquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of these practices, and the situations in which the practices are carried out. (p. 162)

The importance of these differing explanations is one outlines the benefits the Guide might have for my participants, while the other discusses potential benefits for me as a practitioner. Personally, I believe that both perspectives are important and significant.

Therefore, when collecting data about the Guide I considered both how it might benefit both students and classroom teachers.

3.2 Data Collection and Analysis

Data collection occurred from May 1st through May 31st in 2019. Students used the PBL Guide to develop personal mixed media photography projects and then answered a series of questions in the form of a digital survey about how useful they felt the Guide was in the development and documentation of their project. Mixed media projects were selected as the open project because I felt that it had the greatest potential for variety and exploration across a variety of disciplines.

For data collection various qualitative research methods were used, including: document collection (completed PBL Guides, student projects), informal participant observation notes, and questionnaire surveys. Each of these methods was then coded, sequenced and analyzed using content analysis, frequency counting (Dawson, 2019, pp. 122-129), and quasi-statistics (Becker, 1970, pp. 39-62).

This allowed me to review the PBL Guide and how it was used by students, as well as their direct verbal and written responses about the document. This data could then be examined in a statistical format to see if it was successful in meeting some or all of the components outlined in my critical question. It also let me explore how the Guide might be improved for the age range tested, and any gaps that it might not currently address. All of this feedback was then leveraged to improve my solution.

3.3 Limitations

The study is limited by a small student sample size at a single location with a limited range of ages. Some of these limitations could not be mitigated based on available time and resources. I also received a limited number of student survey responses about the PBL Guide at the end of the project, comparative to the number of students that participated in using the Guide, which could potentially skew the survey response results. Another limitation is the inclusion of students in just one classroom discipline. This was mitigated to some degree by having students work with a range of mixed media techniques, vs. producing traditional photography.

Chapter 4. Description and Analysis: The Roadmap

For this study, all of my photography students completed a PBL Guide as part of an assignment on how to combine photography with one to two forms of other media in an effort to create a 2-dimensional or 3-dimensional mixed media photography artwork. After completing the assignment, students were offered the chance to participate in an online Google Survey about using the PBL Guide to track their art making process (Appendix E). A link to the survey was posted on Google Classroom and then shared with students. The survey consisted of seven questions, four multiple choice and three short answer. At the end of the project the final artworks were photographed (Appendix B-D), and the PBL Guides were collected along with digital copies of the surveys. In the end 44 artworks, 30 PBL Guides, and 13 digital surveys were collected.

When reviewing the artifacts of this research, I tried to discover links and draw parallels between how students actually used the PBL Guide during the project and the success or rigor of their final work and process documentation. I was also very interested in how students reacted to using the PBL Guide in the surveys and what this might reveal about its overall effectiveness and how future iterations might be improved.

4.1 PBL Guide: Ideation

4.1.1 PBL Guide: Ideation (Description)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING

STAGE #1

IDEATION

USE STAGE ONE IF YOU DON'T KNOW WHAT YOU WANT TO MAKE.

PART 1

CHOOSE ONE IDEATION APPROACH

PROBLEM / NEED BASED APPROACH

You can make something based on a problem you notice, or a need someone has. This could be a big thing like helping reduce the homeless population in your city, or a small thing like keeping your room tidy.

OPTION ONE - Over the course of a few days, keep a small journal with you at all times and make a note in it when you find something that annoys you, makes you sad, or that you notice someone else struggling with. Use these problems as the catalyst for creating a project.

OPTION TWO - Consider a topic that you are very passionate about. Consider what problems are associated with the problem. Design a project to fix one of these problems. Some possible big topics might include:

- Environment	- Transportation	- Community
- Education	- Housing	- Health
- Culture	- Jobs/Income	- Business
- Safety	- Communication	- Entertainment

INTEREST BASED APPROACH

You can make something based on the stuff you think is interesting. You can also combine multiple interests together. If you like dogs and movies, try making a movie about how dogs see life -or- create a guide about movies that feature dogs.

1. MAKE A LIST HERE OF ALL THE THINGS YOU ARE INTERESTED IN. ANYTHING IS FAIR GAME.

Photography Music
The Environment Lifestyle
Colors interior design
engineering water
Fashion Drawing

2. PUT A NUMBER 1-10 NEXT TO EACH TOPIC BASED ON HOW INTERESTED YOU ARE IN IT.

GROWTH BASED APPROACH

You can make something based on a skill you need/want to improve. For instance, say you struggle with computer programming, but want to make a video-game that requires coding. You can create several simple projects to learn how to code.

1. MAKE A LIST HERE OF THINGS YOU STRUGGLE WITH -OR- WOULD LIKE/NEED TO GET BETTER AT.

Chemistry Some Sports
time management going to bed
waking up Not talking as much

2. WHICH OF THESE THINGS IS MOST IMPORTANT TO LEARN NOW? WHICH CAN WAIT TILL LATER?

MATERIAL / MEDIA BASED APPROACH

You can make something based on the materials and tools you have available -or- a certain media you want to try out. If you have wood, try a woodworking project. Want to learn to cook? Try creating a new recipe.

<p>WHAT MATERIALS DO YOU HAVE AVAILABLE?</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Drawing Stuff <input checked="" type="checkbox"/> Paint/spray-paint <input checked="" type="checkbox"/> Paper/cardboard <input checked="" type="checkbox"/> Cloth/old Clothes <input checked="" type="checkbox"/> Wood <input checked="" type="checkbox"/> Plastic <input checked="" type="checkbox"/> Clay <input checked="" type="checkbox"/> Glass <input checked="" type="checkbox"/> Metal/hardware <input checked="" type="checkbox"/> Electronic Parts <input checked="" type="checkbox"/> Trash/recyclables <input checked="" type="checkbox"/> Food <input checked="" type="checkbox"/> Computer <input checked="" type="checkbox"/> Music Instruments 	<p>WHAT MEDIA WOULD YOU WANT TO TRY?</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Drawing <input checked="" type="checkbox"/> Painting/Street Art <input checked="" type="checkbox"/> Paper-cuts, Origami <input checked="" type="checkbox"/> Clothing Design <input checked="" type="checkbox"/> Plush figure <input checked="" type="checkbox"/> Furniture/Carving <input checked="" type="checkbox"/> 3d Printing <input checked="" type="checkbox"/> Ceramic Dish-ware <input checked="" type="checkbox"/> Sculpture <input checked="" type="checkbox"/> Circuitry/Coding/App <input checked="" type="checkbox"/> Cooking <input checked="" type="checkbox"/> Graphic/Web Design <input checked="" type="checkbox"/> 3d Modeling <input checked="" type="checkbox"/> Music
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FIG 1 - PBL Guide: Ideation (Approaches 1)

PROMPT BASED APPROACH

A prompt acts as a starting point or limitation for a project. They can be medium specific (create a painting inspired by a machine) -or- it can be general, design something at two very different scales (elephant size vs postage stamp size).

Make something 100 times.

Make something huge and then try making it again tiny.

Make something without the use of one of your senses.

Collaborate with someone, each making half of a project.

Make a project only using found materials (no buying stuff).

Make a project using only plants & other elements from nature.

Make an object that transforms into something else.

Create a project that uses at least 3 different materials.

Create an object using materials that wouldn't usually be used.

Make something that blends in or stands out from it's surroundings.

Make a project to help a specific person, then try to scale the idea.

Create an invention that works in a ridiculous way (A Chindōgu).

FOR MORE PROMPT IDEAS TRY SEARCHING ONLINE FOR "LIST OF (PROJECT/ART/WRITING) PROMPTS".

REMIX BASED APPROACH

Everything is a remix. Pair any two concepts or components and you have the potential for innovation. For instance if I pair a car with a frog, what do I get... An idea for Better hydraulics? A frog drag race? The options for remix are endless.

PICK ANY TWO ITEMS FROM THE CATEGORIES (or add your own) & BRAINSTORM WAYS TO COMBINE THEM.

Cars/Trucks/Cycles
Planes/Helicopters
Trains/Mass Transit
Personal Computers
Small Electronics
Appliances
Cameras
Speakers/Headphones
Lamps
Furniture
Houses/Buildings
Roads
Weapons
Robotics
Prosthetics/Wheel chair
Clocks/Watches
Games/Video-games/Toys
Medicine/Birth Control

Silverware/Culinary Tools
Plate/Drink-ware
Clothing/Shoes
Hats/Bags/Accessories
Haircut/Nails
Tattoos/Piercings
Art/Sculpture
Musical Instruments
Art Supplies
Wood/Metalworking Tools
Pencils/Pens/Paper
Books
Animals
Germs/Viruses
Food/Drink
Plants/Trees/Garden
Awards/Trophies
Currency

LOCATION BASED APPROACH

Use this approach if there is a certain community that you are interested in helping (your neighborhood, refugees in Greece, etc). What struggles does that community have? How can you create something that will help?

1. MAKE A LIST HERE OF A FEW COMMUNITIES / GROUPS / PLACES THAT YOU WOULD BE INTERESTED IN HELPING.

The Bobbins Nest
The Hope Center
Foster care
Young kids
nursing homes
patients hosp.

(For example a specific nature habitat, local nursing home, etc.)

2. RESEARCH YOUR CHOSEN COMMUNITY (online, interviews, etc) FOR POTENTIAL PROBLEMS THAT NEED SOLVING.

Hunger
clothing
families
Money
time
age

(High costs to feed animals, elderly people feel isolated, etc.)

THEME BASED APPROACH

Themes help act as a way to give yourself limits so that you don't have too many options. They focus your attention on a concept without stipulating what you should make. This leaves room for creative interpretation.

Seasons
Natural Elements
History / Time / Age
Metamorphosis
Legends / mythology
Genders
Journeys / Exploration
Religion / Theology
Anatomy / Movement
War / Violence
Growth / Plants
Dreams / Nightmares
Illusions (optical)
Emotions
Heroes / Villains
Power / Strength

Monsters / Supernatural
Steampunk / Sci-Fi
Minimalist
Death / Entropy
Race / Culture
Music Genres
Art Periods
Dance Styles
Locations (Urban, country...)
Secrets / Hidden / Lost
Identity / Self
Alien / The Other
Types of Food / Beverage
Cities / Countries
Fate / Destiny
Clothing Styles / Textures

YOU CAN FIND MANY MORE THEMES BY SEARCHING ONLINE FOR "LIST OF (PROJECT/ART/WRITING) THEMES".

FIG 2 - PBL Guide: Ideation (Approaches 2)

PART 2 EXPAND YOUR IDEA**WHY?**

This one word has the potential to get at the root of the issues surrounding your concept. For instance, lets say your initial concept is to create a way to curb teens using their cell phones so frequently.

Why is it a problem that teens use their cell phones so often?

Why do teens use their cell phones so much?

Why might a teen choose not to use their cell phone as much?

Why are cell phones so addicting?

Why do cell phones exist?

Try asking as many why questions as you can around your idea. Answer these questions with as many possibilities as you can think of. Ask others these questions. This will help generate more possibilities to make your end product more successful.

HOW?

Asking how can begin to solve the questions you posed when asking why. Use what you discovered when answering your why questions and pose them as how questions.

How can we prevent teens from using their cell phones so often?

How might we incentivize/reward students for using their cell phones less?

How can we make not using your cell phone fun?

How could you market the idea of using cellphones less to teens

How can we use what we know about addiction to help curb teen cell phone use?

How can we create more authentic experiences for communicating that don't rely on cellphone?

Your answers to these questions will help you create a solution for your idea that is innovative, rather than something that will try and fail, or an idea that has been tried many times before.

WHAT IF?

Asking what if is another way to adapt and change your idea and gain new incites about how your idea could be created that you may not have thought of before. Try thinking about cause and effect. If we do something to what we are making, how will it effect how it works and how people will interact with it?

What if we made it faster/slower?

What if we made it bigger/smaller?

What if we made it more complex/simpler?

What if we made it last longer/only last a short time?

What if we made it exclusive/super easy to get?

What if we made it durable/fragile?

What if we mass produced it/made it by hand?

What if we made it heavier/lighter?

What if we made it Hot/cold?

What if we made it loud/quiet?

What if we made it Rigid/flexible?

What if we made it cheaper/expensive?

What if we made it futuristic/vintage?

What if we made it rough textured/soft?

What if we made it out of a different material?

FIG 3 - PBL Guide: Ideation (Expand your Idea)

The ideation section of the PBL Guide is the first section of the document. It includes multiple approaches to help students come up with an “original” idea, as well as questions students can ask themselves to help expand on and focus their idea. An example of the ideation stage of the PBL Guide completed by a student can be seen in figures 1-3 above. The approaches presented include:

- The Problem-Based / Need-Based Approach
- The Interest-Based Approach
- The Growth-Based Approach
- The Material-Based / Media-Based Approach
- The Prompt-Based Approach
- The Remix-Based Approach
- The Location-Based Approach
- The Theme-Based Approach

Each of the approaches was designed to help students think differently about how ideas can come to be. Having a variety of methods also keeps the ideation process fresh for those that use this Guide multiple times. Some methods, such as growth-based ideation allow students to focus their project on an area they want to improve in. Others like the problem-based approach are more closely linked to design thinking methods and invite students to develop a project to help fill a need within their own lives, or the lives of groups around them. By simply making students aware of these different methods it also teaches them that there is no one right way to start a project. The questions asked after introducing the various approaches were an attempt at engaging students in Socratic questioning. It asks students to ask a series of questions starting with the words “Why”, “How”, and “What If”. There was also the

example concept of developing something to curb teens from using their cell phones so much. The “Why” questions ask why a concept, or problem, might be of interest or importance. An example “Why” question from the Guide is “Why is it a problem that teens use their cell phones so much?” By contrast, the “How” questions help a student answer the questions posed by the “Why” questions. An example “How” question from the Guide is “How can we make not using your cell phone fun (for teens)?” Finally, the What if questions invite students to think about their idea in a unique (and sometimes absurd) way that might be the spark for a unique solution to their problem. Examples from the Guide using the “What If” prompt include: “What if we made it exclusive (or) super easy to get?”, or “What if we made it bigger (or) smaller?” Not all “What If” questions work for every scenario or concept. These question starters were developed to help both broaden and focus a person’s thinking about a concept. This is probably the most difficult area of the document to assess in terms of engagement. Only five students actually wrote their own questions on this page, but the questions may have influenced what students wrote about in the “expand your idea” area of the process section of the PBL Guide.

After collecting the students’ final PBL Guides and documenting their final projects through photographs, I reviewed all of the artifacts to identify what areas of the Guide were used the most and how they were used.

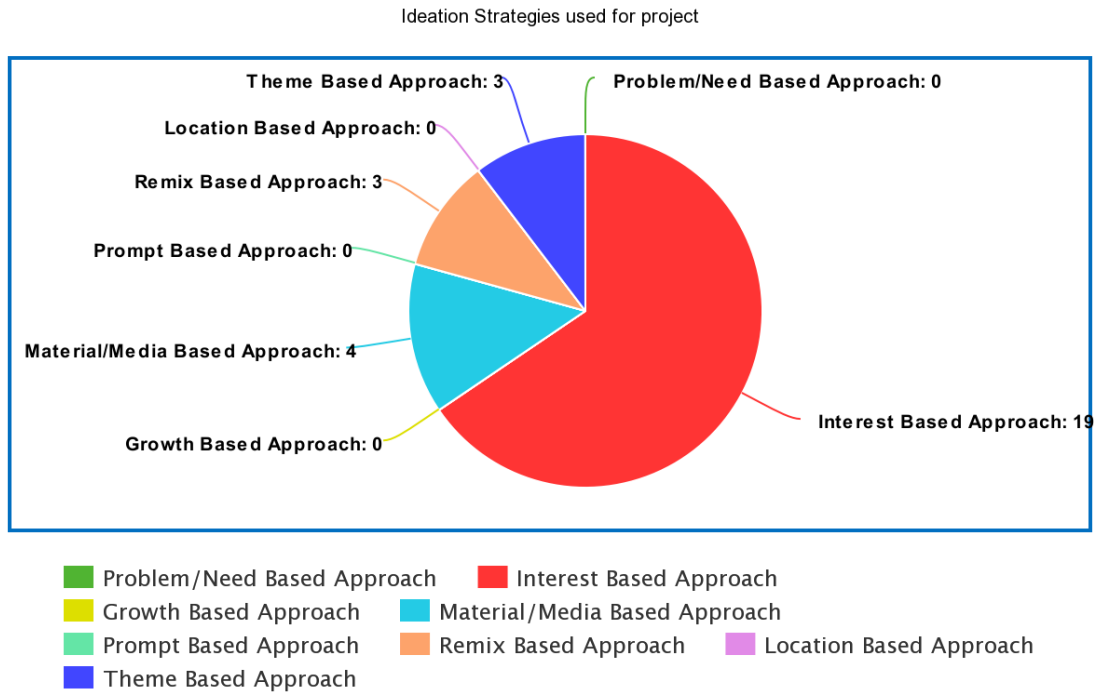


FIG 4 - Ideation Strategies Used (Chart)

In the ideation section, of the eight possible ways to come up with an idea only four were actually used for the student's ideas, though there is evidence that students interacted with all approaches. The strategies that students used are visualized in figure four, above. All ideation methods that were interacted with, but not necessarily used by students, has been visualized in figure five, below. By far the least interaction was with the prompt-based approach, with only one student interacting with it, versus between 10-28 students considering the other approaches.

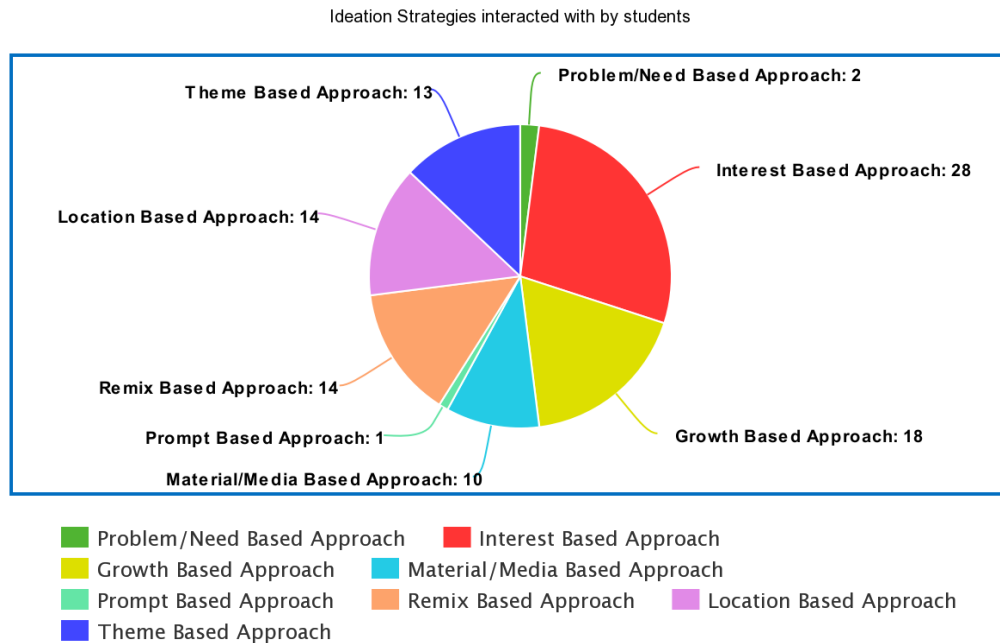


FIG 5 - Ideation Strategies Interacted With (Chart)

For their final idea, the majority of students (19) opted to use the interest-based approach. Four students also ended up using the material-based approach, three used the remix approach, and three used the theme-based approach. The most common themes that students used within their project were:

- Inner thoughts and emotions (9)
- Pieces of a larger whole (6)
- Societal judgement of self and others / Stress/ Body Issues (5)
- Family (4)
- Memory (4)
- Journeys (3)
- Identity (3)
- Time (2)
- Loss (2)
- Childhood and Imagination (2)
- Music (2)
- Secrets/Hidden (2)

These themes align with my observations of teen concerns and priorities. These themes are mirrored by information about teenagers presented by the Centers for Disease Control and Prevention, that states “During this time,[15-17 years of age] your teen is developing his unique personality and opinions. Relationships with friends are still important, yet your teen will have other interests as he develops a more clear sense of who he is.” and, “Your teen might have concerns about her body size, shape, or weight. Eating disorders also can be common, especially among girls.” as well as “Children in this age group might: Go through less conflict with parents...[and]...Show more concern about future school and work plans.” (cdc.gov, 2020) These statements relate directly to the themes that students explored in their concepts providing an interesting snapshot into what these students are thinking about, valuing and expressing with their artwork.

4.1.2 PBL Guide: Ideation (Analysis and Recommendations)

When considering why students chose to use one approach over the others, the story that emerges is that approaches that had the least steps and complexity for a photography project were picked most by students, allowing them to get to the process of making more quickly. For instance, with the most popular option, the interest-based approach used by 19 students, users simply had to make a list of their interests and use those to base their work on. By contrast with the least popular option, the prompt-based approach used by no students, a user would first have to think about what kind of a challenge would be appropriate and useful within the perimeters of the project they were expected to complete. They would then have to create a prompt, and then make work

that fulfilled whatever challenge they gave themselves, while still fulfilling the project's original stipulations. There are many more steps and mental hoops to jump through with this option and this may have caused students to avoid the prompt-based approach because they were not looking for a time-consuming challenge in their already busy lives, instead doing a natural thing and taking the route of least resistance. Had the prompts already been available and students needed only choose one to make their art about, this approach may have been much more popular. One of the responses to the survey alluded to a need for simplicity, saying "[instead of the multiple] ideas for planning, just do the one that everyone has to follow." In other words, having a simplified workflow with limited decisions needing to be made is easier to follow. This might be one option or way to use this Guide to avoid students just using ideation methods that they know or are comfortable with. Alternatively, a teacher might give an option between two approaches for ideation, or cover all of the methods, one per project. This is important because giving students lead choice is a major part of PBL. Having multiple approaches to ideation helps teach students that a project can have many routes to success and that the most successful projects often take the least likely or straight-forward routes. Adding successful case studies using different methods of ideation might be one way to combat fear of the unknown without prescribing a certain way of ideating.

Another possibility for the lack of diversity in the approaches that students chose is that some of the approaches may have been poorly explained by the Guide. Normally, I would have modeled each approach before having students use the Guide,

but in this study I was interested to see how students would respond to the ideation methods without background, as this Guide was designed to be used independently of a teacher or class. A consequence of this is that students seemed confused about how some of the ideation methods worked. A response on the student survey corroborates this idea. When asked what was confusing or unnecessary about the PBL Guide one student said “The first couple pages asking about volunteer work, and more things that confused me in how that would help me with a photography project.” A second student simply responded with “Going to do community work.” To mitigate confusion, I would recommend teachers reviewing each of the approaches as a class, assign a different ideation approach for each project, and/or model how and why a particular ideation approach might be used/useful. It also might be worth reworking the ideation section to work differently, possibly limiting the approaches to themes, problems, materials, and challenges.

Reviewing the PBL Guides it becomes clear that many students attempted to fill in nearly all of the ideation methods, which is not how the ideation section was intended. This may have been because of a design flaw, with many students missing the prompt to “choose one ideation approach” because of the smaller less blatant type. It is also maybe unclear why one approach would work better than another for a certain project. This should definitely be addressed in a future rework of the PBL Guide by making it clear that students only need to choose one ideation method and finding a way to help them decide which will be most effective for their project.

For the second part of the Ideation section of the Guide, there are two major reasons that emerge for the lack of engagement. The first is that there was not any prompted work space for students to use on the same page as the questions that were asked, meaning no way to really assess if students were reading and responding to the example questions or not. The second is that based on my observations and interactions with my students during this research study, the majority cared more about if a piece looked “cool” (personally aesthetically pleasing) versus if it actually communicated an intended idea or feeling to its audience. I am not certain why my students felt that way, but the majority seemed to share this sentiment. This can be demonstrated by two responses about what was confusing or unnecessary about the PBL Guide: 1) “The part with the prompt telling you to ask questions that probably wouldn’t help “improve” the project.” 2) “I think asking why so much can feel a little excessive because while this has the potential to improve the strength of your project, some great creations are born from the desire to make something that just looks cool, rather than something that has a deep meaning to it.” This points to the potential for a teachable moment about the differences and interplay between art aesthetics and concept. It also is a possible place for further collateral to be developed to address this mentality. Perhaps another tool(s) could be developed to assist teachers in student understanding of the importance of the thematic and conceptual elements of art and design works.

4.2 PBL Guide: Process

4.2.1 PBL Guide: Process - Expanding On Your Idea (Description)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING

STAGE #2

PROCESS

USE STAGE TWO FOR PLANNING OUT WHAT YOU ARE GOING TO MAKE.

FOLLOW THE PROCESS STEPS BELOW

STEP 1 I WANT TO MAKE A sculpture that has multiple images that are easily judged.

Sum up your idea in a few words here.

EXAMPLES:

- A photo series about how different fads have changed over time
- A table made out of only things I would normally throw away or recycle
- A song using only sounds captured in nature and person singing
- A recipe that only uses ingredients that are the color blue

STEP 2 EXPAND ON YOUR IDEA

Write more information about your idea. Describe what interests you about the project and why you chose to pursue this idea. What themes are you exploring and how do they relate to the work you create as a person who makes things?

→ what interested me about this project was the fact I could incorporate multiple images into one form. These images are like people/things/subjects we see everyday. It is human nature to observe/judge/ask about store information. The idea is that there are multiple square/circles of varying heights that will have images pasted on all sides. When you walk around it and look at different angles you will see different angles. There will be layers and levels. The eye will make an opinion therefore proving that it's human nature to judge everything it sees.

→ The themes I am exploring are judgement, human nature, different views, and layers.

STEP 3 I PLAN TO FINISH MY PROJECT BY

May MONTH 7th DAY 2019 YEAR

FIG 6 - PBL Guide: Process 1 (Expanding on your Idea)

In the area where students expanded on, or unpacked, their ideas I examined how long each student's written response was, and if they fully unpacked and considered their idea or if they spoke very basically about their concept. An example of the first page of the process stage of the PBL Guide completed by a student can be seen in figure six, above. Out of the 30 students, only two wrote long entries (150+ words), 19 wrote medium length entries (75-149 words), and nine of the entries were short (20-74 words). Looking at the content of the ideas I also wanted to determine how many students unpacked their ideas utilizing Part 2 of the ideation stage considering connected themes, personal meanings, a range of potential visuals and their cultural meaning/implications, materials, and processes. The Guide was designed to help students improve the complexity of their idea as they go, encouraging them to do research of similar artworks, consider what materials and tools they will use, document new vocabulary, and iterate as they go. At this stage I acted as a resource to answer student questions, and help students who were struggling develop an idea. Unfortunately, despite verbal connection with students about their ideas, when I read their written ideation statements I determined that only five students (16%) fully unpacked their concept, 14 students (46%) considered the idea but with less depth than the first group, and 11 students (36%) talked about a very basic idea with little depth, often only the what/how they planned to build rather than discussing the why behind the concept.

4.2.2 PBL Guide: Process - Expanding On Your Idea (Analysis and Recommendations)

Out of the students who participated in this research study, about one third struggled to elaborate on their idea in writing, causing them to discuss primarily what they wanted to make or how it might look, rather than why it should be one way rather than another. Many also struggled to describe how their work would affect or influence those that saw it. Based on my observations of students working in class, this might be because many of my students struggled to write abstractly about a broad theme. For example in thinking about the theme of body issues, students tended to stick with tropes that they had seen used by others when addressing this theme such as measuring tape, scale, mirror, and makeup. Then using those tropes in the same way they had seen them used before. This shows concrete thinking versus abstract problem solving, discussed by Jean Piaget (1970) as part of the formal operational stage of child development.

Despite my students being old enough, and me working with them one-on-one in some instances, many struggled to think and write about abstract concepts. To understand this I dug into developmental psychology and found that some scholars suggest that the divergent thinking necessary to create novel abstract ideas is based on acquiring knowledge experientially and then using that knowledge in increasingly complex forms, rather than in stages (Siegler & Richards, 1979). This suggests that my students may simply lack a range of life experiences to draw from. It also leads me to believe that regardless of having a comprehensive format to record their ideas and

progress, as well as a creative veteran to help bridge gaps in ideation, students will likely need practice, exposure, and coaching to improve their ability to think and write abstractly. Seeing exemplars of what successful written idea statements look and sound like might be one place that an updated version of the PBL Guide could assist with this, but it will only be part of the solution. A small thing that could help some at this stage is a reminder to talk about the idea behind the work vs. how you plan to create it or have it look. I also believe that if I had the opportunity to conduct this study again, having baseline writing data to compare student writing against and recording of the verbal conversations I had with students about ideation could lead to greater insights about why students struggled with conceptual writing.

4.2.3 PBL Guide: Process - Influences (Description)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING		STAGE #2 <i>continued</i>	PROCESS																		
STEP 4	INFLUENCES	<p>Research other artists, content creators, and inventors that are doing work that is similar to the work you are doing. Record these people's names, and info about what you find interesting about their work and what parts of their work you might borrow (appropriate) from the way they make things. Collecting images or samples of their work can also be helpful.</p>																			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%; text-align: left; padding: 5px;">NAME</th> <th style="text-align: left; padding: 5px;">WHAT'S INTERESTING/INFLUENCING ABOUT THEIR WORK?</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">JR</td> <td style="padding: 5px;">they do a lot of street art surrounding eyes</td> </tr> <tr> <td style="padding: 5px;"> <div style="border: 1px dashed black; padding: 5px;"> Do they have a Website? Have they created any Media (books, music, video, etc)? yes yes, they have worked w/ movies, makes videos, has written a book. </div> </td> <td></td> </tr> <tr> <td style="padding: 5px;">Michael de Courcy</td> <td style="padding: 5px;">A majority of his work is in black & white</td> </tr> <tr> <td style="padding: 5px;"> <div style="border: 1px dashed black; padding: 5px;"> Do they have a Website? Have they created any Media (books, music, video, etc)? yes books and video </div> </td> <td></td> </tr> <tr> <td style="padding: 5px;">Robert Heinecken</td> <td style="padding: 5px;">their work is hyper, black and white, and made for another audience</td> </tr> <tr> <td style="padding: 5px;"> <div style="border: 1px dashed black; padding: 5px;"> Do they have a Website? Have they created any Media (books, music, video, etc)? NO books </div> </td> <td></td> </tr> </tbody> </table>		NAME	WHAT'S INTERESTING/INFLUENCING ABOUT THEIR WORK?	JR	they do a lot of street art surrounding eyes	<div style="border: 1px dashed black; padding: 5px;"> Do they have a Website? Have they created any Media (books, music, video, etc)? yes yes, they have worked w/ movies, makes videos, has written a book. </div>		Michael de Courcy	A majority of his work is in black & white	<div style="border: 1px dashed black; padding: 5px;"> Do they have a Website? Have they created any Media (books, music, video, etc)? yes books and video </div>		Robert Heinecken	their work is hyper, black and white, and made for another audience	<div style="border: 1px dashed black; padding: 5px;"> Do they have a Website? Have they created any Media (books, music, video, etc)? NO books </div>					
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STEP 5	NEW TERMINOLOGY	<p>During this project did you learn about any new terms, tools, techniques, computer key commands, tricks, etc? Record them here.</p>																			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 35%; text-align: left; padding: 5px;">NEW TERMS/TOOLS/ETC</th> <th style="text-align: left; padding: 5px;">EXPLANATION</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">EXAMPLE - Shutter Speed</td> <td style="padding: 5px;">This is how fast a picture is taken. The longer the shutter is open, the brighter your picture will be. Fast shutter speeds such as 1/1000sec freeze motion while slow ones such as 1/20sec allow motion to blur. With a tripod very slow speeds such as 3"sec can create ghostly images if things move and light/star trails. When shutter speed goes up, aperture or "f-stop" often has to go down to balance the amount of light.</td> </tr> <tr><td style="height: 40px;"></td><td></td></tr> <tr><td style="height: 40px;"></td><td></td></tr> <tr><td style="height: 40px;"></td><td></td></tr> <tr><td style="height: 40px;"></td><td></td></tr> <tr><td style="height: 40px;"></td><td></td></tr> <tr><td style="height: 40px;"></td><td></td></tr> <tr><td style="height: 40px;"></td><td></td></tr> </tbody> </table>		NEW TERMS/TOOLS/ETC	EXPLANATION	EXAMPLE - Shutter Speed	This is how fast a picture is taken. The longer the shutter is open, the brighter your picture will be. Fast shutter speeds such as 1/1000sec freeze motion while slow ones such as 1/20sec allow motion to blur. With a tripod very slow speeds such as 3"sec can create ghostly images if things move and light/star trails. When shutter speed goes up, aperture or "f-stop" often has to go down to balance the amount of light.														
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FIG 7 - PBL Guide: Process 2 (Influences)

The Influences portion of PBL Guide was one of the most successful at engaging students. Overall 19 students listed three different artistic influences, one listed two influences, four listed just one influence, and six listed no influences at all. An example of the influences and new terminology parts of the PBL Guide which have been completed by a student can be seen in figure seven, above.

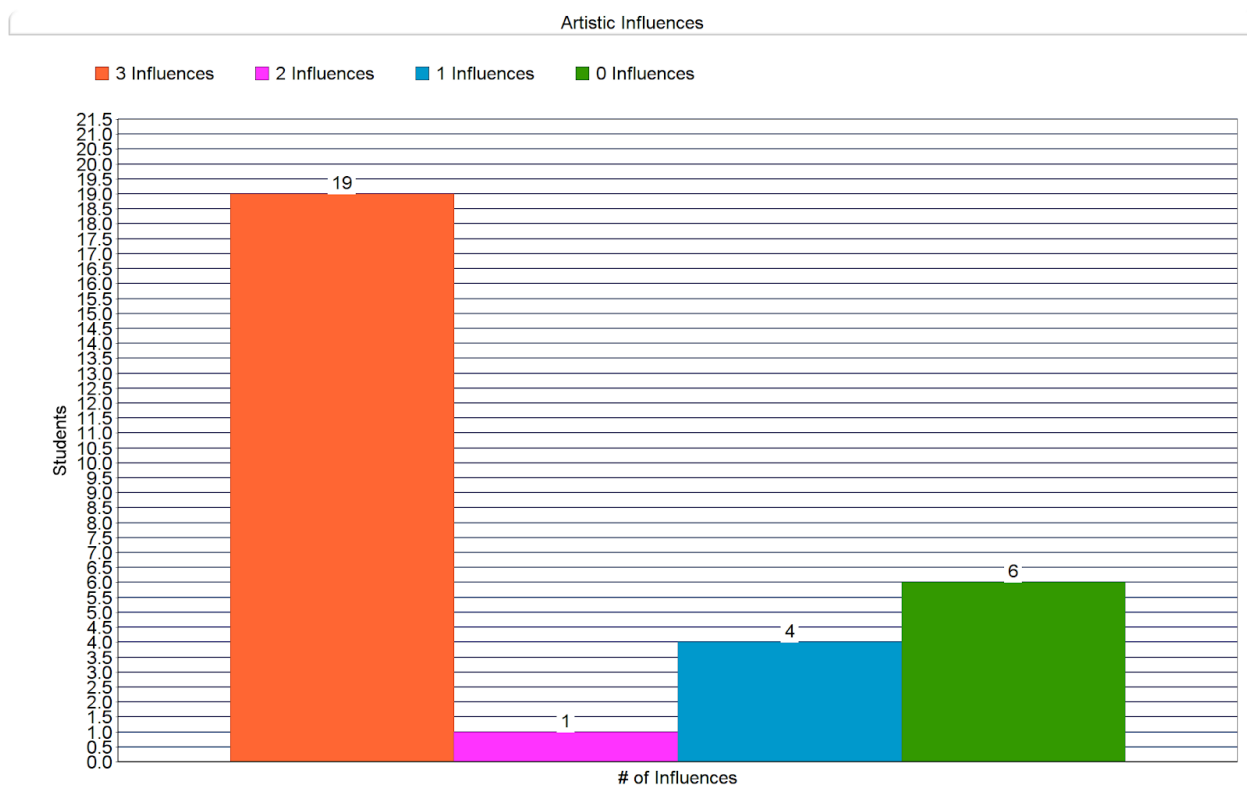


FIG 8 - Artistic Influences (Chart)

Most students who researched and recorded influences also included a short blurb about how the work was relevant to their idea, and where we could go to find more info about the influence, including websites, books, and so on. A chart visualizing the number of students that recorded three, two, one, or no influences can be seen in figure eight, above.

4.2.4 PBL Guide: Process - Influences (Analysis and Recommendations)

This section of the PBL document engaged the majority of my participants and in that regard it was successful. Students seemed to be inspired by seeing what others had made; using similar ideas and themes as a jumping off point. By seeing that beautiful, interesting and sometimes challenging art could be made around the concepts that they were interested in, students felt validated and confident that they could be successful. When responding to what the best part of the PBL Guide one student said, “The part where we had to find an artist with the same kind of work, I feel I cooked in a little bit of that idea in the end.” I am not certain what the student means when they say they “cooked in a little bit of that idea,” but I can infer it meant that they took portions of the artworks that they saw and integrated those ideas with their own recipe to come up with the end product. Another student said, “You can make ideas on the fly with the packet, the inspiration section was the most helpful.” Being inspired by others is what leads many into the arts, and by experiencing a connection with other artists’ work, students may have been motivated to make similar connections with others based on their own work and viewpoints. If the Guide were to be made in a digital format this process could be built into a web-based program to make recommendations of artists and makers related to the students tagged themes and key words.

4.2.5 PBL Guide: Process - New Terminology (Description)

In the new terminology section students were supposed to record any new words, concepts or processes that they learned during the creation of the project. The new terminology section of the PBL Guide had one of the worst rates of engagement,

almost mirroring the last section with only five students recording two relevant new pieces of terminology related to the project, six recording one new piece of terminology, and 19 recording zero. Many students also tried to write down definitions to things covered much earlier in the course that were not new learning which were not counted.

4.2.6 PBL Guide: Process - New Terminology (Analysis and Recommendations)

Looking at how students interacted with this section suggests students saw this area of the packet as more of a hassle than an opportunity to show and record growth. The fact that students tried to pass off past learned ideas and terms for new content demonstrates that they were just trying to fill things in rather than striving to actually learn something new and record that learning. As I discussed in the ideation section, rehashing something you already know is much easier than synthesizing disparate ideas into something new, taking both less time and less energy, and if they did not have anything new in their project (a risk) then it is likely they didn't have a new term or process to put in this space, but still potentially felt obligated to write something. As the old adage says, You don't know, what you don't know.

Had I highlighted more new techniques during in-class workshops or spoken to students with more one-on-one discussions about their packets during the project, I believe engagement in this area could have been improved. That said, this section also may be more important for other content areas that rely more heavily on technical processes, such as key commands or operations in graphic design for instance. It would be worth re-examining to see if this section could be presented differently to make it more appealing to all. I unfortunately had no responses about this section on the

survey. In retrospect, I probably should have included a question where students had to rank the sections from best to worst, or one question about each section to guarantee feedback on all sections. These would be worthwhile changes in future studies to maximize participation.

4.2.7 PBL Guide: Process - Sketching (Description)

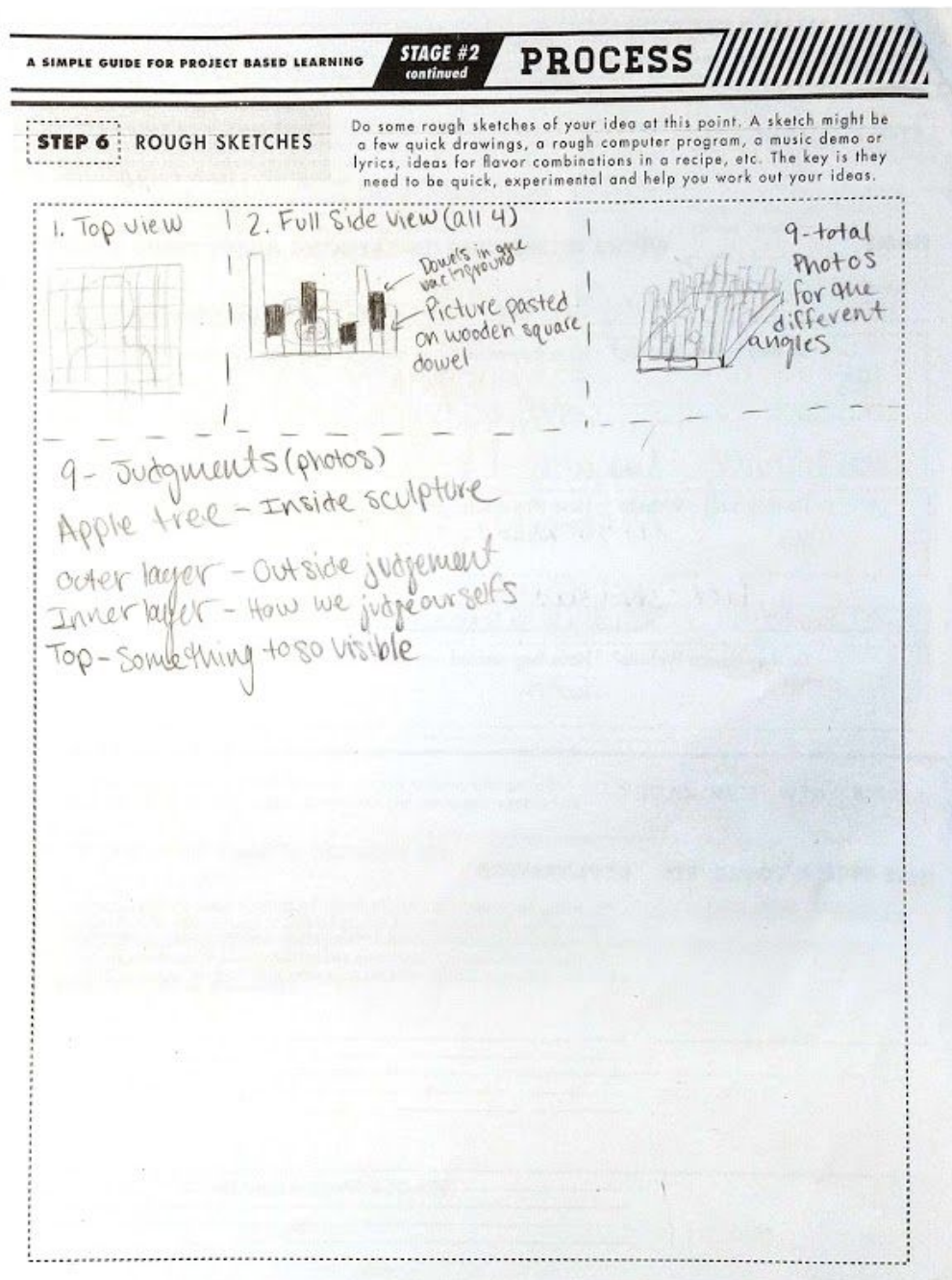


FIG 9 - PBL Guide: Process 3 (Sketching)

Nearly all students utilized the sketching section in some fashion, but how much they engaged varied widely. An example of the sketching part of the PBL Guide which has been completed by a student can be seen in figure nine, above. The section was

designed to be a space for them to visually map out their project, with various versions, before building a final or iterative version. Overall 15 students did an adequate to above average job planning out their ideas in the sketching section, and 15 students struggled, only basically mapping out their idea, with few details.

4.2.8 PBL Guide: Process - Sketching (Analysis and Recommendations)

The high use of this area could be caused by many of my students being visual learners, but student feedback also suggests that the sketching section helped them revise and refine their ideas as they worked. When asked about what they believed the most effective parts of the PBL Guide were, one student wrote: “The sketching zone was the most useful to express my thinking, and to take a broad idea and grow it into something more specific.”

The disparity in student achievement in this section could stem from the fact that I tested this Guide in a photography class where my students were notorious for being reluctant to sketch and may have actually selected the class because they believed that there would be little to no drawing. A lack of drawing skills, and visual creative thinking practice can make it hard for many introductory-level art students to visualize what they want to create before physically making it. The struggles of some students might be alleviated with the help of exemplars, showcasing what successful, average, and low level work looks like in this area. Also by taking the Guide to a digital format more options could be offered such as making a digital sketch, rough conceptual photos, or even a 3D rendering.

4.2.9 PBL Guide: Process - Materials and Tools (Description)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING		STAGE #2 continued	PROCESS
STEP 7 MATERIALS & TOOLS		THINGS TO CONSIDER WHEN GETTING TOOLS & MATERIALS:	
<p>TIME - When do I want/need to have my project done? How long will it take to get my supplies? Where am I going to get them? Often this is one of the most time consuming parts of making something and requires planning.</p> <p>COST - How much will my materials to make my project cost? Can I get them cheaper somewhere else? Who is paying for the materials? If you need to buy the materials you may need to consider fundraising first, or asking for donations. Many times you can find free materials if you are creative. For instance, free wood can often be found in the form of pallets and curbside furniture. You can also often make a project cheaper by simply scaling down the size of it.</p>		<p>TOOLS - Many materials require specialized tools or equipment to work with them. When selecting materials be sure that you will have access to the right tools and software to be successful. Be aware of safety precautions that come along your material as well. You may find a lot of this information during your research step.</p> <p>QUALITY LEVEL - How nice/finished does my end product need to be? If this is just an early prototype you can probably make it out of a simple materials like cardboard or paper (which will also speed up the process). If the end product needs to have high quality craftsmanship, what materials will I need to get to make sure this is possible?</p>	
MATERIALS -&- WHERE ARE YOU GETTING THEM?		QUANTITY	COST
Wooden dowels - Craft/hardware store	1 - 2 ft long		
Glue - Already have	9		
Pictures - Taking/printing	~3 ft		
String? - Home	1		
Cutting tool - Metals			
Foam (have)			
Acrylic Paint (have)			
Mini people (have)			
Moss (Joanns)	1 package		\$6
TOOLS -&- WHERE ARE YOU GETTING THEM?		QUANTITY	COST
Scissors	1		
Box Saw	1		
Hot glue gun	1		
Repe			

FIG 10 - PBL Guide: Process 4 (Materials & Tools)

Surprisingly to me the highest area of student engagement in the entire Guide was in the materials and tools section. An example of the materials and tools part of the PBL Guide which has been completed by a student can be seen in figure 10, above. All 30 students listed at least the materials they would need, and 25 of the 30 students listed both materials and tools that they would need for the project. Most students also included the quantity and cost (if any) of each. Some students struggled delineating between tools and materials, and some put a cost for materials that they already had for free at home.

4.2.10 PBL Guide: Process - Materials and Tools (Analysis and Recommendations)

Rewording the sections to “tools and consumable materials”, listing a few examples, and changing the wording of cost and quantity to read as questions such as; “How many will I need?” and “Can I find this for free? If not, how much will it cost?” might clarify things further in a later iteration of the Guide. I believe engagement in this section was high because it offered the students a space to organize their immediate needs for the project. This was different from my intended purpose for this section as a repository for knowledge to refer back to in the future. When I asked students verbally if it was helpful to have a place to plan out what they needed to create work for the project, the students overall reported to me that it was helpful, which aligns with the level of engagement achieved by this section of the Guide. In a digital format this list could even include live links to places to purchase supplies online with prices that adjust automatically.

4.2.11 PBL Guide: Process - Test / Revise / Iterate (Description)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING		STAGE #2 continued	PROCESS
STEP 8	TEST / REVISE / ITERATE	When starting your project you want to work quickly to get a working prototype that you can test. This might be a scale model, sample photos, or full size model made out of simple materials.	
Once you have something rough, you can begin to have people try it out give feedback. This will help you make improvements and discover errors that you initially overlooked. Revise based on the feedback you get, fixing the problems you had. Then do the whole process over again. This process is called iteration.			

ATTEMPT 1			
WHAT DID YOU CREATE?			
A sculpture incorporating photos			
HOW DID IT GO?			
Fairly well			
HOW WILL YOU CHANGE/IMPROVE IT?			
Add slash			
I would stabilize the dowels so they are more stable			

ATTEMPT 2			
WHAT DID YOU CREATE?			
HOW DID IT GO?			
HOW WILL YOU CHANGE/IMPROVE IT?			

ATTEMPT 3			
WHAT DID YOU CREATE?			
HOW DID IT GO?			
HOW WILL YOU CHANGE/IMPROVE IT?			

FIG 11 - PBL Guide: Process 5 (Test / Revise / Iterate)

In the Test / Revise / Iterate section of the Guide I prompted students to write about what they created, how the experience had gone, and how they planned to improve what they had already created. An example of the test / revise / iterate part of the PBL Guide which has been completed by a student can be seen in figure 11, above. Six students documented three meaningful changes with their project, 12 documented two meaningful changes, nine documented one meaningful change, and three did not document any iteration.

Many students seemed to be able to identify problems with their work, but often struggled to go in-depth when considering how the work could be improved. Most seemed to focus on specific construction or compositional failings, rather than examining how or why their artwork was or was not working from a conceptual perspective.

4.2.12 PBL Guide: Process - Test / Revise / Iterate (Analysis and Recommendations)

One of the reasons for the brevity of the responses in this section is that only a small area was provided to write, suggesting that giving a short answer was acceptable. Had the prompts instead suggested examining how the work is affecting an audience or communicating an idea students might have been more apt to talk about conceptual failings versus compositional or craftsmanship issues. Despite the short answers, one of the student responses from the survey identified this section as a benefit to their end product saying, “The revisions section, writing out what I didn’t like about what I made and how I could improve it helped actually improve it.” This is one of the areas that I

think could be improved most easily by making the Guide into a digital format. It would afford students the ability to upload process images, videos, charts, and more and then get live feedback about their changes from a community of people, who might offer questions, critical feedback, praise, and even awards. This community could help supplement a teachers' role, offering a range of opinions and expertise and giving students more attention than any one teacher could do alone.

4.2.13 PBL Guide: Process - Reflection (Description)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING

STAGE #2
continued

PROCESS

STEP 9 PERSONAL REFLECTION

At the end of your project it is important to reflect on the process. Consider what you accomplished, what you learned, what went well, and problems you encountered to avoid in your future projects. Take ownership for your work, and really think about how things went.

I ended up doing more than I anticipated initially. I did accomplish a lot with this project although in the beginning I was hard to get started with the first 4 stages of this sculpture. Reasons including resources not being readily available and student hours. The biggest challenges with this project was that a lot of it had to be done in class, having to find all the resources for the project outside of school, having to come up with the money to buy these resources/materials. I learned that I shouldn't have a set goal of what I am doing, because acting unexpectedly can definitely improve your piece in ways you didn't expect. The overall project ended up turning out surprisingly well and the construction was not too bad, it just took time. I struggled with keeping the jewels stable because of the holes they were placed in. Overall I am very happy with the piece/sculpture I have created & am interested to see what people think.

FIG 12 - PBL Guide: Process 6 (Reflection)

Similar to the section of the Guide dealing with unpacking the students' ideas, many students struggled to reflect meaningfully on the end product and their process to get there. An example of the reflection and part of the PBL Guide which has been completed by a student can be seen in figure 12, above. In terms of length, nine students had a long personal reflection (150+ words), 12 reflections were of a medium length (75-149 words), seven were short (20-74 words), and two did no reflection. In terms of content, only two fully reflected on the project, it's meaning and the process to

get there (6%), while nine students reflected in a more basic way (30%), and 15 simply described what they did, rather than reflected on it (50%). Many students simply talked about if they liked how the project turned out without elaborating about how or why it was conceptually effective.

4.2.14 PBL Guide: Process - Reflection (Analysis and Recommendations)

After reviewing the students' reflections it is clear that writing at length and with clarity about the abstract underpinnings of their projects was challenging for students. Even when the ideas were clearly evident in their final projects, students often struggled to put those more complex concepts into words. For instance, An image of one student's final project outcomes can be seen in figure 13, below. This student wrote the following reflection about these final pieces:

“Some problems during this project were weather, lighting, my sculpture breaking, and the pieces falling to the bottom of the jar. The worst thing was my wire person breaking. I had spent a few hours making it and I really hurt my thumb while doing so. However, I think the one I re-made turned out a lot better. I really liked my idea, but finding a background was also hard. I do like how my pictures turned out because they have stories behind them and they're full of emotion.”



FIG 13 - Sample of Student Artwork

In this reflection the student clearly talks about her personal process, including struggles, but goes into little detail. For instance, why were certain parts of making the work difficult? She also hints that she believes the work is thematically and emotionally charged but does not elaborate on what the work communicates to an audience, or what stories the work might tell. This could be attributed to students struggling to discuss abstract ideas in an artwork, because they have had a lack of training or

opportunity to do this on a regular basis in my class, or because they are writing their ideas rather than verbally speaking about them. As an educational practitioner this is a clear area that needs to be addressed and improved, and one thing that I will definitely take away from this process.

Another possibility is that the short length and underwhelming substance of the student's written responses could stem from a lack of clarity in how the reflection was prompted. I wrote the following above the reflection section of the Guide, "At the end of your project it is important to reflect on the process. Consider what you accomplished, what you learned, what went well, and problems you encountered to avoid in your future projects. Take ownership for your work, and really think about how things went." This prompt never asks students explicitly to explore or discuss the meaning and themes behind their work. It focuses primarily on process and what students learned. While this is important, I believe it led students to write more generally about if they liked how the work turned out, and what they learned from doing the work rather than discussing the content and quality of the work.

One consideration for the lack of student reflection and the lack of quality writing by students when using the Guide overall is that the paper nature of the Guide made it less user friendly than it otherwise might have been if offered in a digital format. Some advantages a digital format might offer include no predetermined length of written entries, being able to upload media of different types based on student learning and presentation preferences (audio, video, images, etc), and the ability for students to access exemplars of other successful projects using the same format. This varies from

the kind of feedback that might be available in a class critique because it gives students a wider range of comparison that can be filtered by specific criteria. By giving students more choice and guidance while keeping things simple, it would allow students to work in an authentic way that compliments their learning style. I also think if the Guide was to be rebuilt at this point, the reflection section's prompt would need to be clarified, and the reflection would be moved to the assessment stage to better align with its intent.

4.2.15 PBL Guide: Process - Challenge Card (Description)

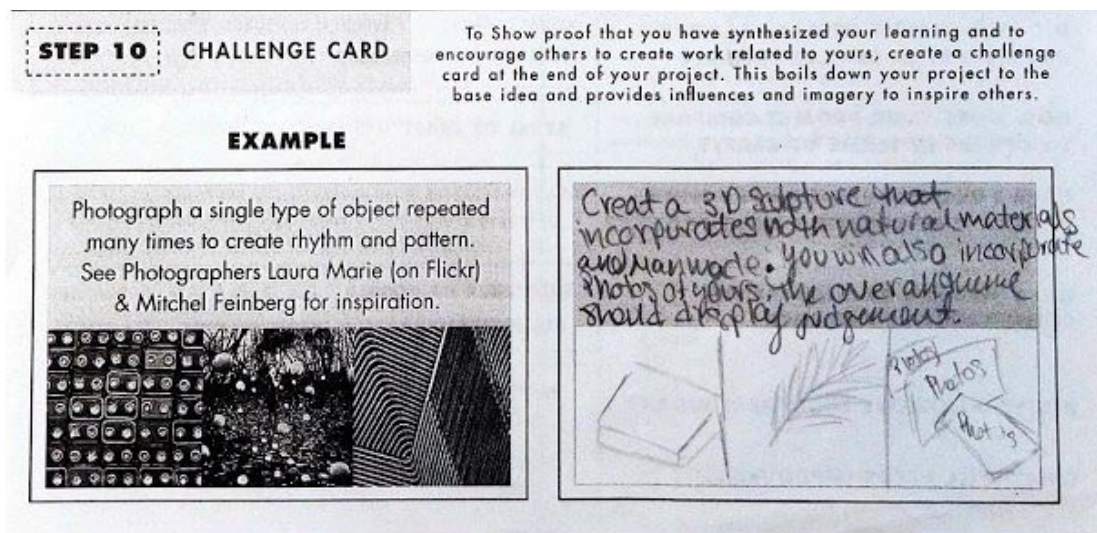


FIG 14 - Synthesis Challenge Card

The challenge card was designed as a simple way to help students synthesize what they learned into a short lesson prompt. A way of restating what their project was about in their own words, while keeping their explanation succinct. It also was intended to include influences for others to look at. An example of the challenge card part of the PBL Guide which has been completed by a student can be seen in figure 14, above.

This section had some of the worst student engagement with only nine students that did it demonstrating understanding on how to pose their ideas in the form of a

prompt that others could use as a catalyst for a new project. A few beyond the nine students also attempted to fill out the card but gave overly specific directions for recreating their exact artwork rather than giving the broad theme for others to explore in different ways.

4.2.16 PBL Guide: Process - Challenge Card (Analysis and Recommendations)

When asked if there was anything they would change about the PBL document, one student commented “Well the only thing I would do is get rid of the challenge card.” Unfortunately, they did not elaborate as to why. Based on the low student engagement, possible reasons for students not completing this section include confusing directions, students not finding value in completing it, or simply burnout from the packet’s length. Some student responses to the survey suggest that burnout might be the culprit. One student said, “I didn’t find anything (that needed changing), but it was a bit too long,” another commented “I would most likely not make the packet so long. I would narrow it down a little so that students don’t have to do so much work and (can) work more on the photographs.”

Another consideration is that the physical size of the card was too small for some to write effectively. Also, it was challenging for students to include photographic references for the card on the paper packets, especially at the small size, making the card harder to complete than it should have been. This might be resolved in a digital format by having visual research digitally uploaded and easily transferred or pinned to

the challenge card. Looking at exemplars might also help students figure out how to synthesize their specific project into a broader project catalyst.

4.3 PBL Guide: Assessment

4.3.1 PBL Guide: Assessment (Description)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING

STAGE #3

ASSESSMENT

USE STAGE THREE TO ASSESS THE WORK THAT YOU MADE.

FOLLOW THE PROCESS STEPS BELOW

NATIONAL CORE ARTS STANDARDS (with language adjusted for PBL)

1. Imagine innovative ideas for your project.
2. Develop your ideas by making multiple drafts, sketches and prototypes.
3. Refine what you have made until the work is well-crafted/finished.
4. Describe your process and identify areas for improvement.
5. Demonstrate how you have improved your skills over time.
6. Consider who is meant to experience your work & justify how it is presented.
7. Reflect on how your work is influenced by a range of other artists/designers/makers.
8. Critically review your work for meaning, effectiveness, and bias.
9. Seek feedback about your work from multiple people and points of view.
10. Express your personal ideas and point of view in your work.
11. Combine cultural, social, & historical ideas in new ways in your work.

DID YOU COLLECT RESEARCH ABOUT PROJECTS WITH SIMILAR THEMES?	VISUAL EXAMPLES / WRITTEN RESOURCES / VIDEO / AUDIO NUMBER OF SOURCES 1 / 2 / 3 / 4 / 5 / 6+
HOW DOES YOUR PROJECT COMPARE TO OTHERS IN TERMS OF CRAFT?	LEVEL OF CRAFT MASTERY / HIGH / MEDIUM / LOW
HAVE YOU DOCUMENTED THE WHOLE PROCESS OF CREATING YOUR PROJECT?	IDEATION NOTES & MIND MAPPING / SKETCHES / RESEARCH DRAFTS & VERSIONS / FINAL PROJECT & PRESENTATION
DID YOU GET AND IMPLEMENT CONSTRUCTIVE FEEDBACK?	NUMBER OF PEOPLE 1 / 2 / 3 / 4 / 5 / 6+ ALL FEEDBACK USED/CONSIDERED? YES NO
DID YOU IMPROVE FROM PAST WORK?	IMPROVEMENT IN CRAFT / CREATIVITY / EDITING STORYTELLING & COMMUNICATION / TECHNIQUES
WHAT STILL NEEDS IMPROVEMENT?	NEEDS WORK CRAFT / CREATIVITY / EDITING STORYTELLING & COMMUNICATION / TECHNIQUES

FIG 15 - PBL Guide: Assessment 1

Looking at the assessment section of the PBL Guide, I found some issues. An example of the assessment stage of the PBL Guide, which has been completed by a student, can be seen in figure 15, above. When examined, 21 out of the 30 students from whom I collected PBL Guides completed the self-assessment section. Of these 21 students, most reported looking at two-to-three sources of inspiration related to their project, visualised in figure 16, below. This showcases disparities between what students actually recorded in the influences section with 19 students recording three influences, one recording two influences, four recording one influence and six not recording any influences. One issue revealed is that there should have been an option for zero on the assessment. It also shows that some students may have only recorded three but looked at more influences. Similarly, some students believed they had looked at less influences than recorded. This disparity in student reporting demonstrates a gap between reality and student perception and/or reporting.

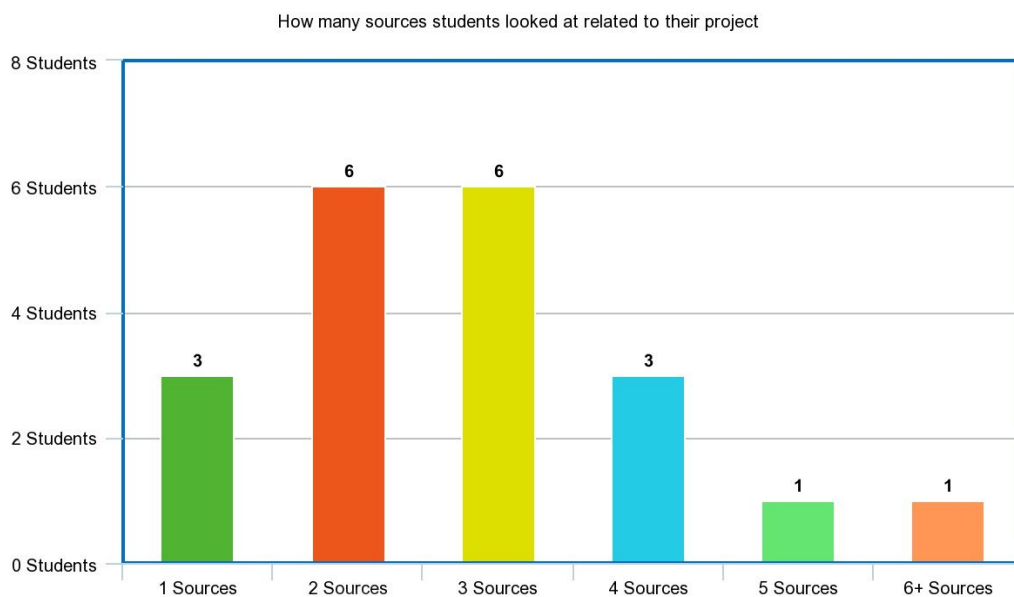


FIG 16 - Number of Sources (Chart)

The vast majority of students also reported that at least 2 people gave them feedback on their project, visualised in figure 17, below. Unfortunately, this data can not be checked against a section of the Guide because while creating the document this section was removed from the test / revise / iterate section to help shorten the Guide and keep it relevant to all project types.

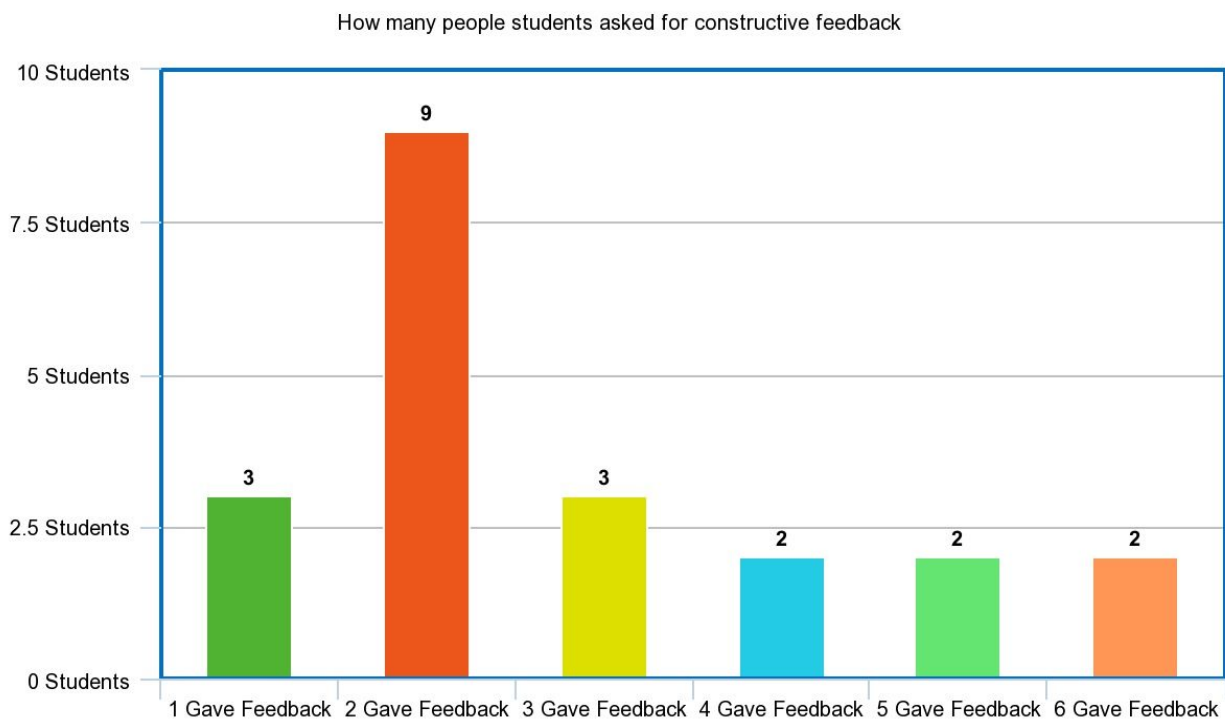


FIG 17 - Number of People Asked for Feedback (Chart)

The majority of students also identified their work as having a medium level of craft which does align with my findings when assessing the student's final projects. However, a disparity can be seen in how many students ranked their level of craft on the project significantly higher than my assessments, with students only admitting to two projects having a low level of craft.

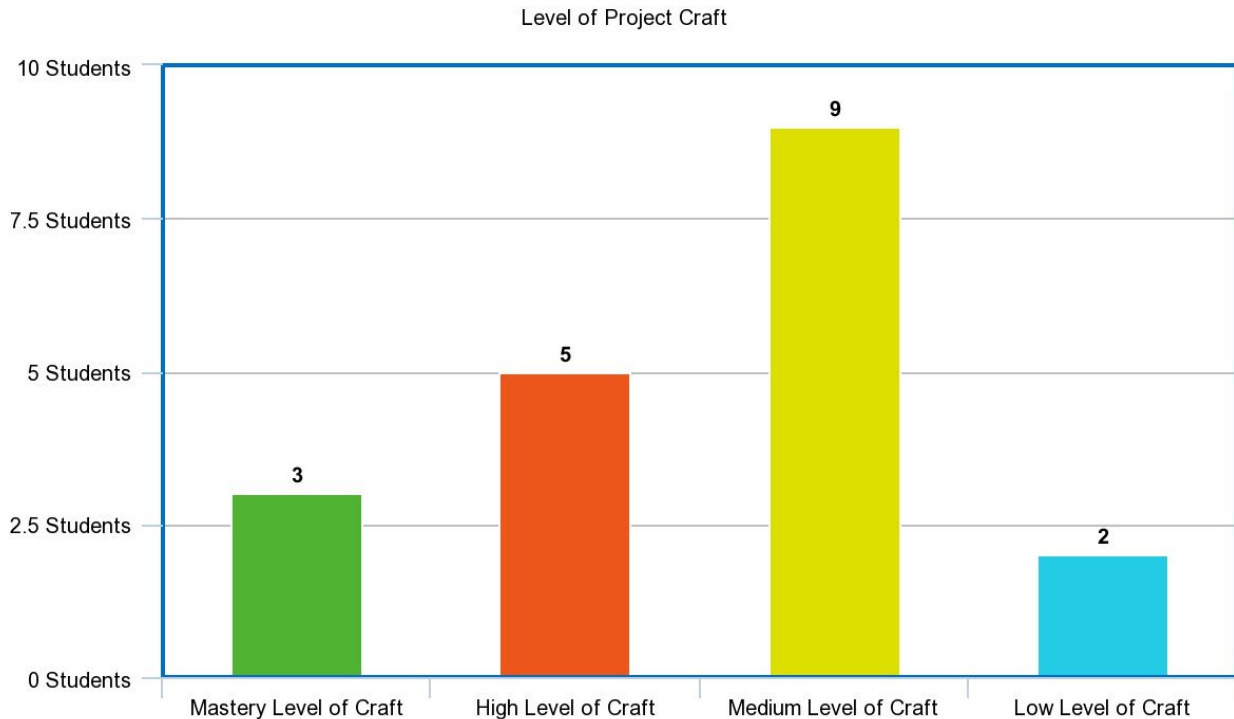


FIG 18 - Level of Project Craft (Chart)

Finally, students identified creativity and craft as their highest areas of growth, meaning these are the areas that they felt they learned the most in, although all areas were relatively high. A visualization of the reported level of student craft can be seen in figure 18, above. Likewise, craft was ranked as the area that also still needed the most work, contradicting somewhat students reporting that they had achieved a high or even mastery level of craft indicated in the previous question. A visualization showing where students felt they learned the most versus where they still need the most improvement can be seen in figure 19, below.

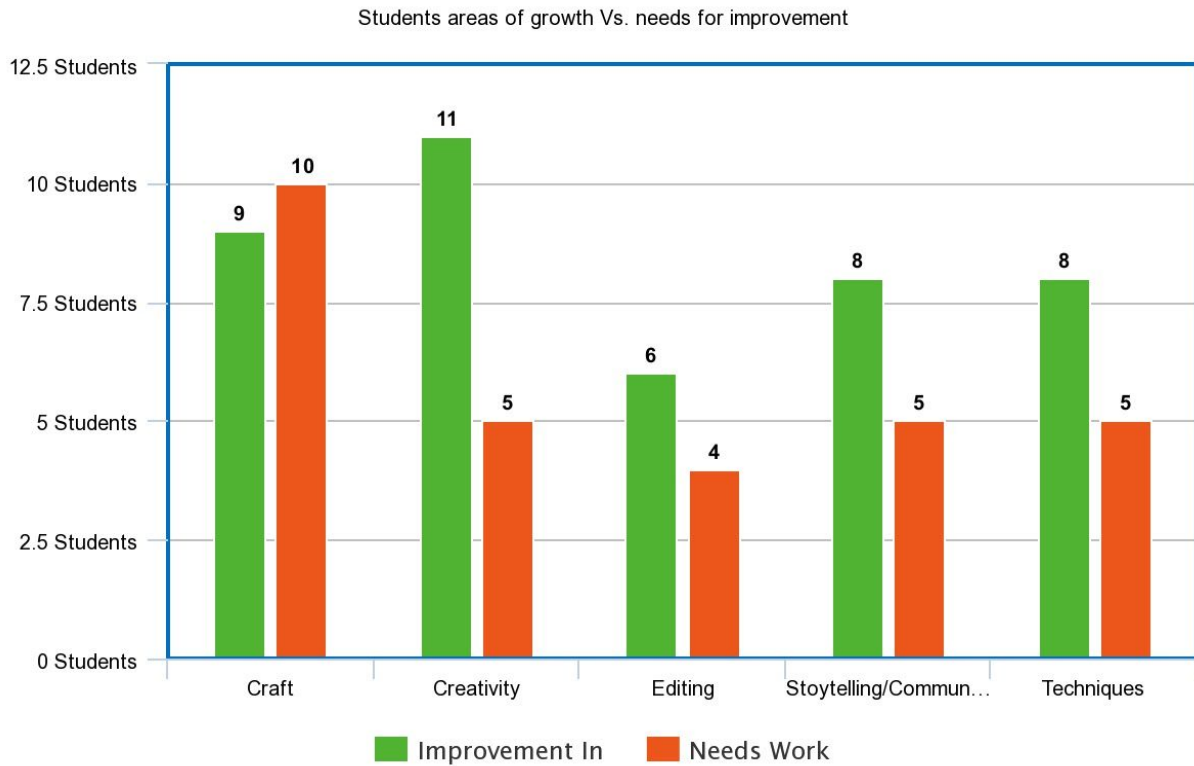


FIG 19 - Areas of Growth Vs Improvement (Chart)

4.3.2 PBL Guide: Assessment (Analysis and Recommendations)

After reviewing the students personal feedback and looking for trends, the fact that students reported improvement in a range of areas might have an explanation. The project students completed for this assignment were very different from others done in the class, and challenged them to work with new materials and skill sets that many were unfamiliar with. This might also explain students feeling like they lacked in the area of craft when building something with their hands, considering they had a lack of experience creating analog forms comparatively to the mostly digital workflow that they had engaged in up to this point.

Overall, despite making it easier for a teacher to have some data points based on student feedback, the assessment section was a weak point of the Guide. The National Core Art Standards adjusted for PBL could be good for a teacher based PBL project Guide but are not really helpful for student self-assessment because they are not directly linked to how the students self-assess. This might be an area that could be improved in the Guide to seamlessly link student self-assessment questions with educational standards. Having students circle answers rather than engaging in a deeper form of assessment, such as a presentation of their learning, is less meaningful in showing student growth and understanding. By defending how they improved, documented, and worked to master in each area students would not simply report competence but demonstrate it. A digital Guide could help students accomplish this, formatting their research at the end of the project in a presentable way and offering the potential to record a virtual presentation of the work.

4.4 Reviewing The Data - Student Artwork

4.4.1 Student Artwork (Description)

After examining the final student project artworks, I placed them into groupings based on my analysis of their level of both craft and concept. I considered initially separating these criteria, but I believe both are necessary and inextricably linked when assessing the quality of student artwork. 15 of the 44 artworks (34%) stand out as having high quality craftsmanship and concept. Another 21 artworks (48%) have medium quality craftsmanship and concept, while eight artworks (18%) showed what I would consider a low level of craft and/or conceptual ideation. Many students did more

than one piece however, so when looking at individual students nine out of 30 created high level work (30%), 14 out of 30 created moderately successful work (46%), and seven out of 30 created low level work (23%). A visualized comparison of student and professional assessment can be seen in figure 20, below. There is a level of bias with this assessment, because this is based on my 10 years of personal experience as an art teacher and my cultural beliefs about what qualifies as strong craft and concept. However, I felt it was important for me to assess the artwork and compare my professional assessment with the assessment made by students about their own work. A bar graph depicting this data can be seen below.

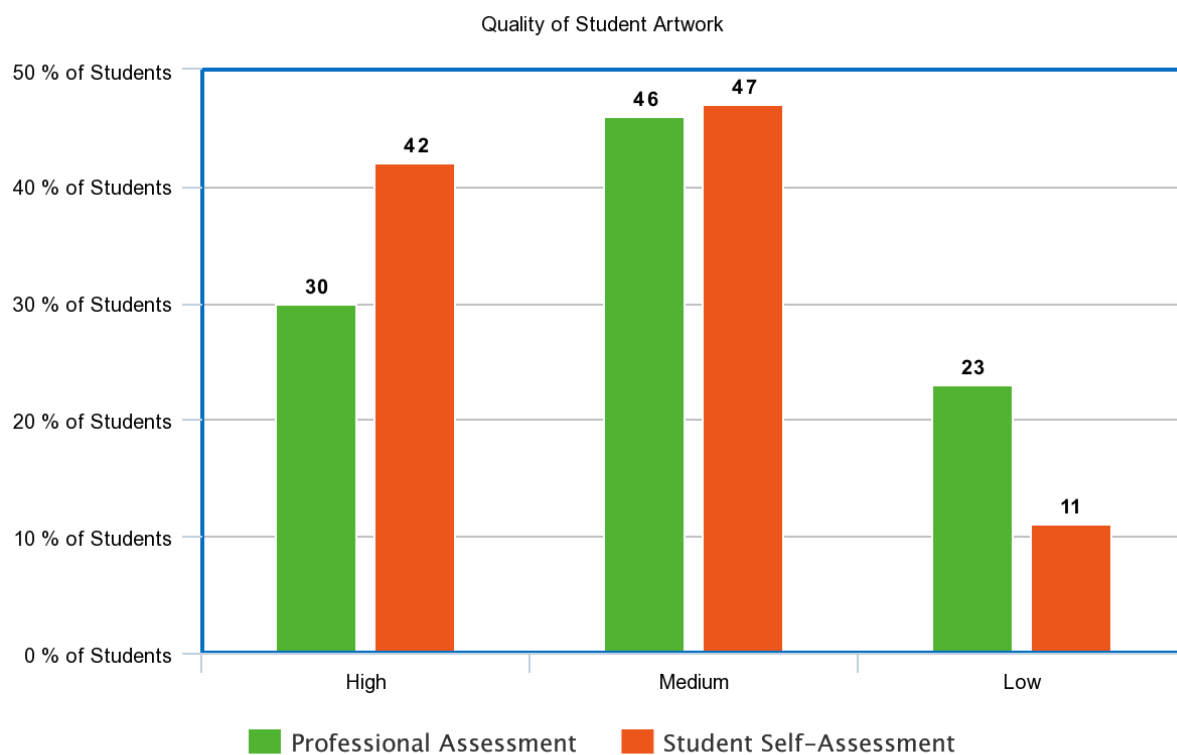


FIG 20 - Quality of Student Work (Chart)

The assessed artworks are also attached at the end of this thesis as artifacts, group by my assessment of their quality level. (Appendix B-D) If this study was repeated, I would reconstruct the assessment section in a way that would help reduce or eliminate more personal bias. This might take the form of clearly stated definitions of concept and craft, followed by having students defend in their own words if their projects meet the criteria for these definitions by citing examples within their work. Another option to consider would be the use of a detailed rubric, which could be enhanced in a digital version of this Guide by allowing students to link areas of writing or research as proof to how each section of the rubric was met.

4.4.2 Student Artwork (Analysis and Recommendations)

Based on the interpreted data students in this study potentially exaggerated the quality of their work compared to the teacher assessments given to the projects. This might be due simply to a lack of comparative experience, the desire to succeed and get a good grade on the assignment, a sense of growth felt by exploring a new skill vs. one that had been honed over time, an exaggerated sense of worth known as self bias, or it could be linked to teacher expectations simply being higher than those of the students.

Despite not having a clear interpretation of why there was a disparity between student and teacher assessment, I still felt that it was important to the study to determine if there was any correlation between the assessed quality of student work and student's written reflections. The following chart examines correlations between project quality, reflection length, and reflection content quality.

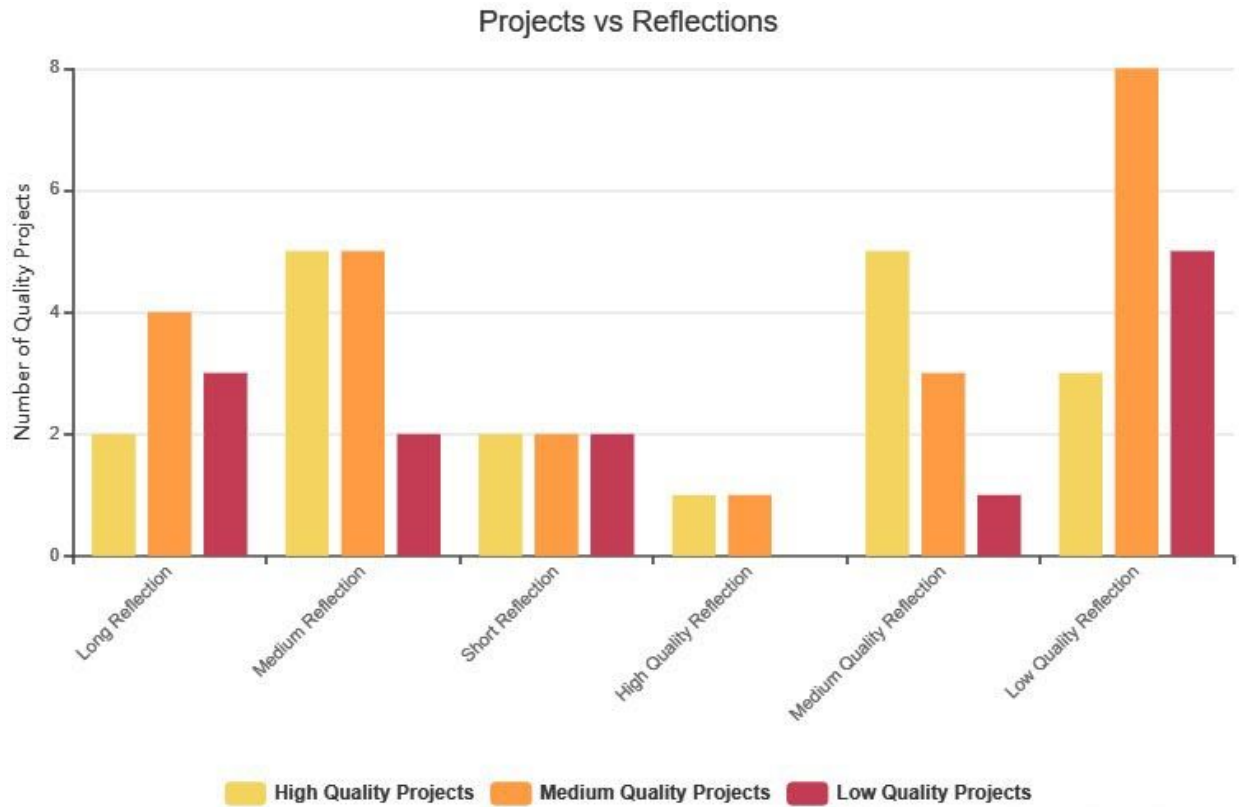


FIG 21 - Projects vs Reflections (Chart)

It appears that longer reflections do tend to be indicative of a higher instance of high and medium quality projects. Likewise, those that created lower quality reflections also seem to produce lower quality project results. These two factors together show a potential correlation between overall project quality and the length/quality of reflections when viewed together. This data is visualized in figure 21, above. It is also worth noting that two PBL Guides where students did not complete a reflection would have raised the short/low quality reflection columns by one medium and one low quality project each. Though this hints at a trend I believe that a much bigger sample size would need to be obtained to better establish any true correlation. I am also not sure if this correlation can be tied to the Project-Based Guide in a way that is useful to it's improval beyond

showcasing the need to help students improve their writing skills through increased practice and exposure to exemplars.

It is also of note that when I reviewed students' initial concepts they broke down into 16% that were fully unpacked, 46% that were somewhat unpacked, and 36% that were minimally considered. Once again, unpacked in this context means that a student considered connected themes, personal meanings, a range of potential visuals and their cultural meaning/implications, materials, processes, etc. By contrast, when reviewing final reflections the fully unpacked reflections declined to 6%, somewhat unpacked reflections declined to 30%, and minimally considered reflections rose to 50%. This net decline in students' writing is concerning because if anything student ideas should become clearer throughout the project creation process. Student's decline in writing at the end of the project might be due to nearing the end of the school year as this study was finished a week before the end of the school year, poor reflection directions, or PBL Guide burnout.

The decline in writing however is also contrasted by the assessed quality of the final projects in terms of craft and concept which rose from student's initial project proposals to 30% high quality, 46% medium quality, and 23% low quality. This could indicate that students have a greater ability to and interest in physically communicating their ideas, abilities and feelings through project-based creation rather than through writing alone. This supports the beliefs that proponents of Project-Based Learning hold in that it demonstrates students showcasing learning in a tangible form that isn't visible in the writing alone. Thus action and visual spatial intelligence have been utilized to

create a tangible form and understanding not visible in written documentation alone. To improve students' ability to document and demonstrate understanding beyond words, if the Guide was built into a digital workspace students would have a greater range of documentation possibilities that mirror this project-based ethos. Other forms of documentation might include creating audio or video reflections or taking photos of their iterative processes.

4.5 Reviewing The Data - Student Surveys

4.5.1 Student Surveys (Description)

Question 1:

If you were required to do a large project without this guide, but you were still required to document your process from beginning to end, do you think it would be easier or harder?

Easier
About the Same
Harder

Question 2:

I feel that the PBL Guide helped direct me through the steps of documenting and organizing my project from beginning to end?

Strongly Agree
Agree
Neither Agree, Nor Disagree
Disagree
Strongly Disagree

Question 3:

I feel the PBL guide helped improve my final product?

Strongly Agree
Agree
Neither Agree, Nor Disagree
Disagree
Strongly Disagree

Question 4:

I think the PBL guide would be helpful for projects in many different content areas? (ie, fine art, design, engineering, woodworking, etc.)

Strongly Agree
Agree
Neither Agree, Nor Disagree
Disagree
Strongly Disagree

Question 5:

What was the most useful part of the PBL Guide? Why?

Question 6:

Were there any parts of the PBL Guide that seemed confusing or unnecessary?

Question 7:

How would you improve or change the PBL Guide to make it work better for you?

FIG 22 - Student Survey Questions

The survey asked questions about whether or not the PBL Guide made project ideation, organization of process materials, and final outcomes easier/better or harder/worse. An example of the digital survey questions can be found in figure 22, above. Likewise, an example of the questions with student responses can be found at the end of this thesis (Appendix E). It then also asked those taking the survey to elaborate on what areas of the Guide were the most and least helpful.

4.5.2 Student Surveys (Analysis and Recommendations)

4.5.2.1 Multiple Choice. 92% students that completed the survey felt that the PBL Guide was helpful in collecting and keeping their process materials organized, and 54% felt that without the Guide documenting their process would be harder. This finding is consistent with what I had witnessed previously with students working on documenting projects. Without a structure to place found information into, students struggled to collect and present important aspects of their research or failed to do the research entirely, creating a lack of focus and understanding about the influences, tools, techniques, and philosophies used to create their final work.

However, only 31% of students felt that the Guide had an impact on improving the project's end result. This could mean that though the Guide is useful in helping students document their process, they are still struggling to see if or how that process affects the final work. This is in contrast to the 26% assessed improvement in the final products of students compared to their initial concepts. This disconnect may be caused by many factors, but some that I have considered are the age and maturity level of the participants and the overall culture of the school, a failure of the Guide to link the impact

of the process stages to student's final product in a meaningful way, or simply a lack of comparative experiences for students to understand how documenting process can impacting learning and future work. It could also mean that using the Guide does not in-fact impact the final work.

4.5.2.2 Short Answer. When asked in a short answer format to identify the most useful areas of the PBL Guide, students chose the following areas:

- Expand on your initial idea (3)
- Revisions / Iteration (3)
- Sketching (1)
- Reflection (1)
- Influences (1)
- Ideation (1)

When considering the areas most identified as useful, they mostly relate to growing an idea and revising it as a product is being created. Students seem at least basically adept at coming up with the seed of an idea, but seem to appreciate the space to expound and improve their idea/product through the act of drawing and writing about it.

When asked in a short answer format to identify confusing or unnecessary areas of the PBL Guide Students brought up the following areas of the Guide:

- Ideation (5)
- Why/How/What if Questions (3)
- Influences (1)
- Challenge Card (1)
- Length (1)

Students consistently pointed at the initial pages of the PBL Guide as confusing, pointing out that there were too many options, and that it was unclear if they were just supposed to pick a single option or try them all out. One student also said that it was “a lot to read through” at the beginning. This feedback doesn’t have the intended effect of giving students choice and efficacy about how they come up with their ideas, but instead frustrates, confuses, and demotivates students. This is most likely due to an error in communication design, not having clear enough communication to students about how the ideation section of the Guide was supposed to work. Several students were specifically confused about using a community or cause as the catalyst for an idea. It is unclear if this is due to students not reading the description of this ideation section, or if it results from a struggle for students to connect school based projects to the real world, but certainly suggests that some change in the ideation section is necessary.

Many students also mentioned that just having a list of sample questions was probably not helpful without the addition of a space to respond to those questions by making up their own. One student said that the questions area was unnecessary because “artists have amazing ideas, but are restricted as to why their ideas should be made a reality.” Another student said “I think asking why so much can feel a little excessive because while this has the potential to improve the strength of your project, some great creations are born from the desire to make something that just looks cool, rather than something that has a deep meaning to it.” I am not sure if I agree with this mindset, but this may be a bias and I should probably allow for a pathway in the Guide

that includes a less conceptual and more process driven approach to making projects. Alternatively this might also speak to a high school mentality that all ideas are created equal and that an artist or maker shouldn't have to justify their work with a sound concept behind that work. The student's responses are also indicative of the sheer amount of questions at the beginning of the process being overwhelming for some, and could be limited to a greater extent.

Other issues with the Guide included one student that did not understand why you might want to record information to track down influences at a later date, another who felt that the challenge card (and synthesizing their idea) was unnecessary, and a third student who cited that the overall Guide was simply too long.

The final short answer question on the survey asked students how they would improve or change the PBL Guide to make it work better. Students suggested improvements in the following areas:

1. Shorten the overall length and/or break the Guide into smaller packets (5)
2. Clarify the Ideation section (2)
3. Add an area to write your name (1)
4. Make the questions asked more relevant to the project (1)
5. A reflective drawing space for changes they would make if they did the project again (1)
6. More areas to write (1)
7. Get rid of the challenge card (1)

This feedback is consistent with both the other feedback that students gave, as well as my own observations on how the Guide was used by students. Based on this feedback, changes that would likely improve the packet include making it more succinct, reworking

the ideation section to improve clarity and usability, adding more areas for students to put their name, write, and draw, and update or change the challenge card at the end of the reflection section.

Chapter 5. Summary Of Findings

After reviewing all of the artifacts from this action research study and reflecting upon the process and observations made, the following findings are supported. Students who used the Guide improved their ability to engage in logical project steps with less assistance than they had without the Guide, organize and document their process, and produce a final product that exceeded their ability to describe the project in written words. This is in comparison to observed habits of these same students and others not involved in this study engaged in similar Project-Based Learning activities without the PBL Guide.

In many ways the Guide performed as I had intended, giving students direction in-between interactions with a teacher. It also gave them a landing pad for documenting and bringing to light their thinking process through writing and drawing in a format that anyone could read and understand. Most students didn't see an improvement in their final project from using the Guide, but the data on the whole suggests to me that their final products were improved from their initial concepts. It is not clear if this is a result of the Guide, but it still demonstrates the importance of Project-Based Learning versus only writing about a concept as students demonstrated understanding in other ways that they could not accomplish through writing alone.

From student feedback, informal observations, and analysis of the completed Project-Based Learning Guides it is also clear that the Guide could be improved upon as a tool. The results of this study have led to a revision of the Guide that could result in even more positive outcomes for students. Many students struggled with using the Guide to efficiently come up with a concept because of confusion over what method to use and how to use it at the beginning of the Guide. This section will require significant revision to improve clarity and become more concise.

The other areas that lacked engagement within the Guide were the space to record new vocabulary related to the project, the section for students to document iterative practice which showed how they reviewed and improved their product over time, and the synthesis challenge card. Overall, many participants also agreed that the Guide was too long. These areas need to be reviewed for relevance, clarity and length in order to develop potential improvements.

From reviewing student usage of the Guide, it is also clear that more needs to be done to support students when writing about a concept in broad terms. Most student concepts and reflections were focused on how work would be created rather than discussing the idea behind their projects. Most responses were also overly brief and lacked evidence to support the projects that they planned to make. It is also worth noting that several students suggested that they didn't agree with the notion that an art piece should need a concept behind it, instead insisting that it could be "something that just looks cool". While believing that all work should include some form of conceptual anchor is a personal bias of mine, it is a bias with important educational implications

and provides valuable opportunities for student learning and growth. To open students up to the importance of conceptual content and discussing their work, it would likely take more exposure and frequency over a broader time frame than this study allowed for, which is a limitation of this research. Unfortunately most emerging young artists don't realize initially that all art is a product of the culture that produces it, and need prolonged engagement to understand the content beneath the surface of the art they look at and produce.

Another revelation based on the data is that students reported a belief that their work was of a higher quality overall than an assessment of the same work reviewed by their teacher. They also believed that they looked at more visual references than they reported in the Guide. This overconfidence in abilities has been documented by a variety of groups including recently by the National Association of Colleges and Employers (2017-2018). One potential solution to improving engagement and understanding that I considered many times when analysing the PBL Guide was taking the extra step to provide exemplars of what low quality versus high quality PBL documentation looks like. Unfortunately with a paper document this would only add length and complexity, two things that were already deemed problematic by student participants.

5.1 Reflection

When I considered what was learned through studying how students both used and perceived the PBL Guide, I started to think constructively about how the Guide could be improved. I wanted to make a space for students to refer back to, keep multiple projects organized, and eliminate the confusion and length of the original Guide while adding exemplars for student comparison. An improved version of the Guide would feature a streamlined experience for student use, while offering more support when it was needed. An example of this is making the ideation process more guided and including links to examples in areas that might be confusing, while not making their viewing mandatory. Also repeated use of the Guide's structure would improve students' familiarity and understanding. So with those considerations in mind and based on the fact that this PBL Guide was part of an action research project I used iterative processes to rework the PBL Guide a second time as inspiration to any who might build upon the results of this research. My main solution was to make a rough mockup of the Guide formatted digitally to address the raised concerns. This mockup can be found at the end of this thesis (Appendix O).

Based on the processes of reworking the Guide, I think the digital space has some real advantages to the paper Guide that was used. The ideation process could provide short case studies of each option, but only allow students to choose a single method. Adding active links, uploadable imagery, embedded videos and 3D models in the influences section would be extremely helpful to students as an ongoing research resource. Effectively organized and leveraged into a community like instructables.com,

a series of projects could inspire and inform large groups of people, inside and outside of the traditional classroom. Likewise, the ability to add only as much content in an area as needed would allow the Guide to be adaptable to a variety of projects, and clickable menus could provide easy access to directions and exemplars that only appear when you need them. An example of this can be seen in Adobe's Photoshop when hovering over tools. Assessment could also be community-based, allowing others to review your ideas and progress, or kept completely private. A badge system could also symbolically reward mentors for reviewing others' work, providing motivation to interact. The Guide could even be adaptable based on the type of project you are doing or your grade level. For those not in a traditional classroom, having prerecorded and potentially even live teacher/mentors as a digital resource would also be immensely helpful in getting the most out of the Guide.

It is also important that I consider how this process and my findings have affected my growth, beliefs, and goals as an artist/educator. I felt that using the same process that I asked my students to go through might be an interesting way to do this, so let me start there. My original idea for the PBL Guide was based off of a problem-based ideation approach blended with a location/community-based approach. I wanted to create a tool to help high school students in a specific school community improve their ability to organize and present process work with minimal help from a teacher (the identified problem).

So "WHY" did I feel this project merited my time and efforts? Why did I want to create this Guide? One reason is that nearly everyone ends up creating a project in one

form or another during their lives and I felt that helping students and myself understand the process of making a project would help demystify how makers get from idea to product in an efficient and well documented way. By intimately understanding this process as a teacher, I have learned a good deal that will help me Guide my future students in a natural way, preventing potential hiccups in the creation process. The research also serves as a reminder that demonstrating and modeling processes is a way that teachers help demystify how quality products can be created with various media. So why then make the Guide student-driven? It has been my experience that students engage much more when they are allowed to make decisions about their learning as they know themselves and their interests better than anyone else. This being said, during this process I have also come to understand more fully the importance of some individualized guidance from a teacher, which is still an essential part of the learning process for most students. Even with a tool that supports Project-Based Learning, they benefit from having a person with experience who can expose them to useful examples and techniques at opportune times. Through this research I feel that students grow more deeply by being gently challenged, pushed into a space where they may not have veered on their own, discovering new things that they would otherwise have been too fearful to unearth.

Next we can ask some “HOW” questions, such as; How has creating, testing, and implementing the PBL Guide affected or changed my beliefs about teaching? I think a large portion of this process has been about conducting research on a deep level about educational paradigms that have been explored before, and how these ideas

might validate or contradict my observations about student learning. Does every student want a voice? What will help them engage with material? How does growth occur? What things need to be put in place to help students retain a process? By addressing these questions and many more I built my Project-Based Learning Guide as effectively as possible, but then I had to do the hard part - putting what I had learned and created to the test, which can be scary. It is this fear that dissuades so many people from creating and sharing creative works. We are afraid of being judged, making a mistake, or being wrong. This same fear, I found through this systematic research process, is present in my students and must be accounted for with support both in the Guide and in my interactions with students. In the process of testing my Guide I discovered that some students may prefer to play things safe, and create derivative work for fear of judgements of their ideas. I have felt this way as a teacher too, but this research has helped to recognize and quiet that doubting voice in my head, because I feel the end result is worth the risk. By exposing students to this same type of training and making them cognisant that the challenge of creative thinking can be fun rather than scary is certainly a component of my teaching that I want to focus on more in the future.

I found that the less fearful students, who engaged the most with their ideas and projects, tended to have the most successful work, did so because they were willing and open to discussing their ideas and adapting them if a better idea came along. This is another identified area of growth for my teaching, focusing on creating a culture where all students are comfortable talking about ideas, and giving/taking suggestions from others about those ideas. This observation suggests that growth occurs based as much

or more from the environment than from a student's initial ability level, which might be an area of interest for future research in creative making. The idea that successful projects are a component of willingness to adjust and change is also indicative of the importance of iteration as an essential element in the process of learning, for both the teacher and the students. By taking the leap of faith and putting my work out there for others to examine, use, and comment on, personal reflection and growth has occurred. Just like my students, I too needed to accept critical feedback by adopting a growth mindset about my teaching and I have increased my capacity for that through this research. I have come to appreciate that by asking students how they would improve lessons, teaching methods and so forth, valuable information can be collected that can be used to improve areas in which I struggle within my teaching practice.

On the subject of critical feedback, another personal takeaway from this process is that students (of any age, but especially those in high school) may be unlikely to respond in a beneficial way to critical feedback unless a culture of critical feedback is established. This research has taught me that it can be productive to create a classroom culture in which critical comments are framed as curiosity. In the future, I will carefully develop a space where it is accepted and expected to respectfully address student work with critical feedback. I have come to believe that in this atmosphere students may develop multiple perspectives to be considered and the level of work will improve over time. From personal experience however, I suspect that it can take years of relationship building to accomplish this kind of classroom culture. Having only been at each of my school placements for 1-2 years recently, this has been a challenge.

However, I have discovered through this process that a way to address students who aren't yet ready for direct critical feedback and help build a culture of discourse is to demonstrate genuine curiosity when talking about student work. If you tell a student that a piece is unbalanced for instance, they will often respond defensively, sometimes even if you sandwich the critical feedback with praise. They will say things like "I wanted it that way" or "I like it how it is", etc. However if you say something like "This is coming along, ! I really like how you used color here. Hmm, I wonder what this would look like if you made this part bigger." By acting truly curious, and by letting them make the decision to adjust the work, they more often responded positively to my suggestions. This is very similar to the "WHAT IF" questions asked by the Guide. This is also the type of question I asked myself when refining the Guide based on student feedback. What if the Guide was shorter? More interactive? Less wordy? What if students could get help on demand?

About my teaching I might also ask these questions, What if I give students more freedom for projects? Would this increase things like how much time I have to spend finding resources for students, creating rubrics, or grading individualized projects? These were reasons that I didn't fully open up projects to be student-driven in the past, but I have learned through this research process that nearly all of these can be mitigated by carefully planning, managing resources, and fully describing how projects are to be graded. While previous to this research I was convinced that open-ended creative prompts were most productive, I have learned that limitations are a necessary part of the creative process. The real benefit of putting limitations on students is that

they help spark creativity, develop problem solving skills, and develop real world skills that they will need in future jobs. Therefore, I am considering adding a “restrictions” componen for teachers to use in a future version of the Guide.

Following ideation, my Guide asks for elaboration on your idea. In my case the idea is about how my growth, role, and perspectives as an educator have shifted during this action research project. Having seen students succeed and struggle in different ways with the Guide, I have come to see that my role as an educator must become one of balancing student-driven work with offering strategic advice and modeling at opportune times during the process. Without this balance, I have come to see that students struggle to communicate a meaningful understanding of complex concepts, and to integrate constructive feedback into iterative end products. I must act as a Guide, assistant, project supervisor and collaborator. Students need to develop efficacy and responsibility for their choices, but also need a sounding board for the choices that they make. I should empower students to make choices and mistakes, empathetically nudging them to take chances, confront fears, and generate new experiences, because these are the areas where they will grow the most. Likewise, I have learned that I must be willing to model the importance of taking chances by working alongside students to create artwork that will not always be successful, and then relying on their feedback and a humble attitude to improve myself. It is in this mutual relationship that empathy is developed, a concept that has become paramount in my interactions with students because without experiencing what you are asking of students it can be hard to understand why a certain step could be intimidating or in need of rethinking.

The process stage continues with a research component, and the recording of new terminology which is essentially what my literature review does. It shows who influenced the Guide and my beliefs as an educator. This research has not only helped refine my point of view, but also created for me a compendium of knowledge for future refinement. During this research process, I absorbed and synthesized the concepts that academic researchers have developed in order to frame my beliefs about teaching and learning. I look forward to further building my teaching practice on these foundations, constructed by the work of scholars who have developed conceptual best practices for Project-Based Learning. I will continue to use and review these theories and examples in the future to keep improving upon my understanding of these educational concepts.

For the sketching stage I felt that it might be useful to create a diagram or mind-map about my educational beliefs and how those have shifted from when this process began to its final conclusion. The following is a visualisation of my change in mindset as an educator during the more than three years it took to construct this thesis:

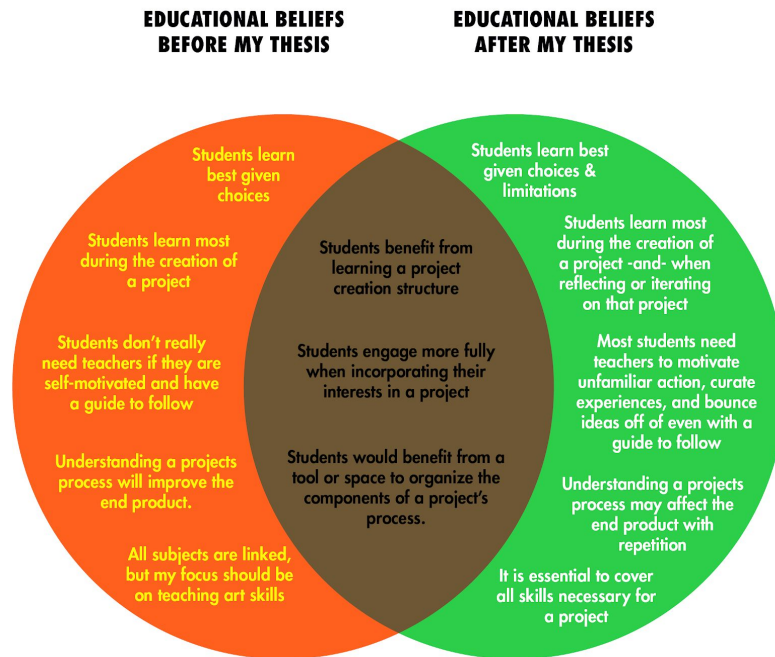


FIG 23 - Educational Beliefs

The major areas that my point-of-view changed were in how students learn best, the importance and role of teachers, how process impacts a product, and the importance of cross-disciplinary education. How these beliefs changed or stayed the same have been visualized in figure 23, above. At the beginning of this process I believed that students needed less teacher direction than I actually have found that they did at the high school level. This was true across the different school sites where I throughout the time this research took place, the first a new, project-based charter school, the second a public high school in a small midwestern city where the actual intervention took place, and finally, my current position in a public high school in the largest city in the state. Without the teacher to frame the use of a tool, it can be misused or misunderstood. It has been in that pedagogical framing that what I developed has been most impactful. This realization is personally empowering to me as a teacher. Students need choice and to

feel that they are the ones driving the car, but without power steering, brakes, windows, automatic shifting, etc., that car becomes very hard to drive. These features act as a metaphor for how I can help students discover the freedom of working within limitations, relying on the wisdom of others, and modeling for students effective methods for learning in my own practices. I also see more clearly now how all the topics of education interlink, and without skills like writing, math, public speaking, research, an understanding of history, etc; that a single subject like art can never be fully understood, expressed or taught.

Some of the tools and materials that I discovered and that I have come to rely on in my daily teaching practice stemmed from this thesis. I have used these tools to help me develop my Project-Based Guide just as I hoped students would use the Guide as a tool to help them in the development of their end products.

1. thenounproject.com - A website with tons of icons that can be used for free on personal projects with attribution or purchased for commercial work.
2. iconfinder.com - Another website with icons, especially social media logos, which can be used for paid or cc licenses.
3. pexels.com - A website dedicated to providing free stock photos and videos for use in any type of project without attribution
4. Ccsearch.creativecommons.org - A search engine to find creative copyright works that use a range of CC licenses which allow for other people's media to be used or adapted on leagly.
5. Citationmachine.net - A website that helps format media citations of various forms into APA or MLA format.

After collecting sources, the Guide focuses on iteration. Similarly, the entire process of creating this thesis has been iterative from the six or seven original directions

that I had planned to take my thesis research, right down to the defense and revisions that were made to expound on my personal journey as an educator. In my experience the concept of iteration is one of the most important parts of the learning process. Without developing things that are meant to be looked at critically and then remade or adapted one can get stuck in a one-and-done mentality. Instead, by expanding my mindset to outside opinions and perspectives I was able to refine and revise my initial project and my written thesis, transforming it in a way that would not have been possible without the help of others. Comparing my initial paper version of the PBL Guide to the revised one, the difference is night and day, not just in appearance but also in functionality. Likewise, when I compare the teacher I was when I first started teaching, or even when I started this adventure that has been graduate school, to the one who is writing the words you are reading today, the effects of iterative change are blatantly apparent.

Some learning has been ancillary to the study but has been integrated with what I learned to make me a better educator. For example, by expanding my point of view on issues such as gender identity and preferred pronouns, the importance of diverse ethnic and cultural voices in the learning process, and restorative practices when dealing with at-risk groups, I have drastically shifted the way I run my classes and the topics that I present to my students. By integrating student-driven project-based practices with these other new understandings of classroom experience, I have turned my beliefs and learning into action that benefits my students.

In personal reflection about this process, the act of carrying out this action research project has definitely been one of the hardest experiences I have gone through as a student and as an educator. It has challenged the limits of my patience, persistence, and abilities as a creative individual. I am now more confident that if presented with a project or experience that seems beyond my abilities or comfort level, that I could in fact probably take on such a challenge, which opens up my practices both as an educator and as an artist. My beliefs about how students think and interact with information have evolved to see students as capable of excelling, but also busy and willing to take shortcuts if the content they are working on is not reviewed, challenged, and made relevant to their lives and futures. In regards to teaching with the Guide, I have learned a great deal about the kinds of tools and content with which students choose to connect.

The last part of the process stage of the Guide was called The Challenge Card, which acted as a component for the synthesis of a project that others could potentially use to create a new project inspired by, but not identical to, your work. A modified version of my guiding research question posed as a challenge card prompt might read as:

Develop a tool to help students create, track, iterate and reflect on the process of creating a personalized project. Give a Recommendation about how teachers will support the use of this tool and consider how the tool impacts your personal educational beliefs and methodologies.

By outlining some useful findings and recommendations for improvement for others who might want to continue similar research in the future, I have also expanded my own understanding of the potential impacts of my teaching practice. By simplifying the entire project down to its essence, I have had to consider which elements of the project are the most important. First, I outline the need for the development of a tool to assist students with project creation. Second, I emphasise my realization that despite the Guide being student-driven, that teachers play an integral role in student understanding of the educational tool. Thus procedures and recommendations should be developed to assist educators in facilitating the use of this tool. Third, it would be fruitful in future research to see how others may consider how the journey has affected them as a teacher, academic researcher, or even generally as a person as I am doing here.

The last stage of the Project-Based Guide I will consider is assessment. The PBL Guide asks six questions about how a person engaged with the Guide. I will attempt to answer these questions when referring to how this process has impacted my growth as an educator.

1. Did you collect research about projects with similar themes? Yes, through this study I did so. When creating the Guide, research was conducted about other guides that existed that may have been comparable to the Guide that I was creating. I found that they were teacher-focused or overly general in their goals. In terms of my teaching philosophy, conducting the literature review expanded my knowledge of contemporary practices about teaching and a consideration of how they have impacted my beliefs. This has been paramount to my growth as an educator. Being able to review a wide

swath of educational theory and then distill the broader field down into elements that resonated with my personal experience and beliefs as an educator was an immense task that helped shape and refine what I teach and how I teach. Rather than preserving the status quo of traditional western educational norms, I chose to focus on a particular subculture of education. The maker movement and many of the concepts and theories connected to that movement represented my collective hopes for where I wanted schools, and more specifically my own educational practice to go. Viewing art simply as an act of “making things” allowed me to understand it as more than just visual expression, opening up creative possibilities in my teaching. Without the artificial constructs of school subjects acting as obstacles, learning rather than learning about art became the goal I had for my students, and for this action research project.

2. How does your project compare to others in terms of craft? I believe that as a designer, my Guide looks aesthetically pleasing, finished, and professional. As an educator, my level of polish when working with students has improved over the years, but still has much room for growth as I encounter new populations. My teaching practice has grown to incorporate new ways of speaking to, interacting with, and communicating with students from a wide range of backgrounds. This has resulted partially from having to change schools a number of times while working on this thesis, which has been challenging from a logistical standpoint, making it difficult to ascertain precisely how I have changed as a teacher. As anyone who has started at a new school can tell you, the first year at any new school is physically, emotionally and mentally taxing. Multiply this by having to start fresh several years in a row, build new communities while trying

to conduct research and you may be able to understand how I often question if it has been my graduate research or my migratory journey that has shaped me more. This being said, I also think that the experience of working with such a wide range of students in different age groups and demographics in just a few years has given me a unique and wide perspective that I have actively instilled into this research. Every new school, age group, and community has its own best practices for navigating political, cultural and socio-economic challenges and I have worked hard to meet those challenges both in my educational practices.

3. Have you documented the whole process of creating your project? Despite having several ways of collecting data for this study, in retrospect, collecting data in more ways could have improved content collection. If I was going to start this process over again, I would suggest going beyond observations, digital surveys, guide collection and project documentation; adding detailed written notes, recorded student interviews at various stages of using the Guide, photographic process documentation, and use of the Guide over multiple projects with a wider sample population. These added elements could reveal more about the benefits and gaps of the Guide as an educational tool, aiding in it's overall improvement. This range of documentation is something I also want and need to improve upon as an educator, because having visibly telling evidence of student growth helps sustain student engagement.

4. Did you get and implement constructive feedback? What may not be evident when entering a master's degree program is how much your concept, research, written thesis, and revisions will be a collaborative process. In my mind, I foresaw myself as

single author, toiling away at a singular body of work, and where parts of the process may have felt like that - the end product of a thesis is developed as a group effort with the student as the primary author, and many editors guiding you to a well rounded end product. Over the course of just the written thesis I must have made at least 100 revisions adding a significant amount of content, depth and clarity to my written work. This action, while time consuming and laden with effort, has resulted in a much better product than if I had been left to my own devices. And this may be one of my biggest takeaways from this labor intensive process. I am only one individual, and without the feedback and help of a myriad of others, I wouldn't have had success. As an educator, no matter how successful, I must never lose sight of the wisdom that others can offer. It is only through iterative change that I can continuously improve the educational experience that I offer my students, as they change from year to year, class to class.

5. *Did you improve from past work? What still needs improvement?* While the iterative version of the student-driven PBL Guide certainly addresses many of the issues of its predecessor, there will always be work that can be done to improve it. Likewise, my teaching is always a work in progress. This is a part of the design process as well as an essential tenant for myself as an art educator, always be willing to discover and improve. It is this willingness to grow and a mindset of lifelong improvement and learning that is a belief that I strive to model and share with my students in order to help them do the same.

With the personal review and reflection of this PBL process finished, and having taken the steps necessary to complete this study, it is rewarding to see the changes that

have transformed me as an educator, which have been made visible in the writing of this thesis. I know that it is in the continued review, reflection, synthesis and implementation of my learning that I will continue to grow, and it is my hope that a dedication to develop positive experiences for my students will be the ultimate measure of my success as an educator.

5.2 Roads Not Traveled

While I moved from school to school several times throughout the time this study took place, the implementation and data collection was limited to one class of students from a particular school context. My findings are, therefore, limited. To get a better understanding of if and how this Guide might be useful and effective at scale, a study that includes a much bigger participant group size, across a series of different demographics such as different ages, genders, races, locations, and project types would be needed. This data would need to be tracked and correlated to find out if a Guide like this could really be universally helpful to students in a broader sense in tracking and improving the quality of a project's processes and products. That being said, with my limited sample size, students seemed open to having a place to learn about the process of creating a project and keep their steps organized.

5.3 Conclusion

When considering and answering the guiding research question of: *Does the Student-Driven Guide to PBL help students create, track, improve, and reflect on a project that they develop themselves?* The answer is multifaceted. While the Guide

seems to act as an effective method of tracking and organizing student processes and research, it is not clear if the creation, improvement, and reflection of student work was improved or impacted positively.

What is clear is that the original version of the PBL Guide, though an interesting idea, needed revision and a change to a digital format. It will need to continue to change, adapt, and grow as it is tested and iterated upon. It is my hope that the range of solutions considered in this thesis might improve the facets of PBL Guide that did not prove successful, and that these improvements might be implemented into another iteration of PBL Guide like the digital mockup created to help improve future research in this area.

Now more than ever I believe that an easy to navigate, user friendly, project-based and student-driven learning space is a gap in the current educational landscape that should be filled. My experiences with changes in schools, educational philosophy and best teaching practices support this. It would give teachers and students an organized space to find past research and conduct future research that is meaningful to their lives. With the success of similar intentioned spaces such as [instructables.com](https://www.instructables.com/), [gurushots.com](https://www.gurushots.com/), and many others, a PBL Guide might act as an online hub that could be used across disciplines by schools to create educational consistency and innovation. It could also provide districts with an online tool that students could access when they are not able to be at school, allowing for research and education to continue without constant guidance from teachers. The importance of such a tool became especially apparent at the very last stage of this study, when the COVID-19 pandemic forced

schools across the country to shutter and teaching to shift to remote learning. I believe that the findings of my study and the revisions I am making to the Guide could be a useful tool in an educational toolbox that is ever expanding and evolving.

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APPENDICES

Appendix A - A Simple Guide for Project-Based Learning

A SIMPLE GUIDE FOR PROJECT BASED LEARNING																															
<div> <div>STAGE #1</div> <div>IDEATION</div> <div>USE STAGE ONE IF YOU DON'T KNOW WHAT YOU WANT TO MAKE.</div> </div>																															
PART 1																															
CHOOSE ONE IDEATION APPROACH																															
PROBLEM / NEED BASED APPROACH <p>You can make something based on a problem you notice, or a need someone has. This could be a big thing like helping reduce the homeless population in your city, or a small thing like keeping your room tidy.</p> <p>OPTION ONE - Over the course of a few days, keep a small journal with you at all times and make a note in it when you find something that annoys you, makes you sad, or that you notice someone else struggling with. Use these problems as the catalyst for creating a project.</p> <p>OPTION TWO - Consider a topic that you are very passionate about. Consider what problems are associated with the problem. Design a project to fix one of these problems. Some possible big topics might include:</p> <ul style="list-style-type: none"> - Environment - Education - Culture - Safety - Transportation - Housing - Jobs/Income - Communication - Community - Health - Business - Entertainment 	INTEREST BASED APPROACH <p>You can make something based on the stuff you think is interesting. You can also combine multiple interests together. If you like dogs and movies, try making a movie about how dogs see life -or- create a guide about movies that feature dogs.</p> <p>1. MAKE A LIST HERE OF ALL THE THINGS YOU ARE INTERESTED IN. ANYTHING IS FAIR GAME.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>2. PUT A NUMBER 1-10 NEXT TO EACH TOPIC BASED ON HOW INTERESTED YOU ARE IN IT.</p>																														
GROWTH BASED APPROACH <p>You can make something based on a skill you need/want to improve. For instance, say you struggle with computer programming, but want to make a video-game that requires coding. You can create several simple projects to learn how to code.</p> <p>1. MAKE A LIST HERE OF THINGS YOU STRUGGLE WITH -OR- WOULD LIKE/NEED TO GET BETTER AT.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>2. WHICH OF THESE THINGS IS MOST IMPORTANT TO LEARN NOW? WHICH CAN WAIT TILL LATER?</p>	MATERIAL / MEDIA BASED APPROACH <p>You can make something based on the materials and tools you have available -or- a certain media you want to try out. If you have wood, try a woodworking project. Want to learn to cook? Try creating a new recipe.</p> <table border="1"> <thead> <tr> <th>WHAT MATERIALS DO YOU HAVE AVAILABLE?</th> <th>WHAT MEDIA WOULD YOU WANT TO TRY?</th> </tr> </thead> <tbody> <tr> <td>Drawing Stuff</td> <td>Drawing</td> </tr> <tr> <td>Paint/spray-paint</td> <td>Painting/Street Art</td> </tr> <tr> <td>Paper/cardboard</td> <td>Paper-cuts, Origami</td> </tr> <tr> <td>Cloth/old Clothes</td> <td>Clothing Design</td> </tr> <tr> <td>Wood</td> <td>Plush figure</td> </tr> <tr> <td>Plastic</td> <td>Furniture/Carving</td> </tr> <tr> <td>Clay</td> <td>3d Printing</td> </tr> <tr> <td>Glass</td> <td>Ceramic Dish-ware</td> </tr> <tr> <td>Metal/hardware</td> <td>Sculpture</td> </tr> <tr> <td>Electronic Parts</td> <td>Circuitry/Coding/App</td> </tr> <tr> <td>Trash/recyclables</td> <td>Cooking</td> </tr> <tr> <td>Food</td> <td>Graphic/Web Design</td> </tr> <tr> <td>Computer</td> <td>3d Modeling</td> </tr> <tr> <td>Music Instruments</td> <td>Music</td> </tr> </tbody> </table>	WHAT MATERIALS DO YOU HAVE AVAILABLE?	WHAT MEDIA WOULD YOU WANT TO TRY?	Drawing Stuff	Drawing	Paint/spray-paint	Painting/Street Art	Paper/cardboard	Paper-cuts, Origami	Cloth/old Clothes	Clothing Design	Wood	Plush figure	Plastic	Furniture/Carving	Clay	3d Printing	Glass	Ceramic Dish-ware	Metal/hardware	Sculpture	Electronic Parts	Circuitry/Coding/App	Trash/recyclables	Cooking	Food	Graphic/Web Design	Computer	3d Modeling	Music Instruments	Music
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Appendix A - A Simple Guide for Project-Based Learning (cont.)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING		STAGE #1 continued	IDEATION																				
<h3>PROMPT BASED APPROACH</h3> <p>A prompt acts as a starting point or limitation for a project. They can be medium specific (create a painting inspired by a machine) -or- it can be general, design something at two very different scales (elephant size vs postage stamp size).</p> <p>Make something 100 times. Make something huge and then try making it again tiny. Make something without the use of one of your senses. Collaborate with someone, each making half of a project. Make a project only using found materials (no buying stuff). Make a project using only plants & other elements from nature. Make an object that transforms into something else. Create a project that uses at least 3 different materials. Create an object using materials that wouldn't usually be used. Make something that blends in or stands out from it's surroundings. Make a project to help a specific person, then try to scale the idea. Create an invention that works in a ridiculous way (A Chindogu).</p> <p>FOR MORE PROMPT IDEAS TRY SEARCHING ONLINE FOR "LIST OF (PROJECT/ART/WRITING) PROMPTS".</p>		<h3>REMIX BASED APPROACH</h3> <p>Everything is a remix. Pair any two concepts or components and you have the potential for innovation. For instance if I pair a car with a frog, what do I get... An idea for Better hydraulics? A frog drag race? The options for remix are endless.</p> <p>PICK ANY TWO ITEMS FROM THE CATEGORIES (or add your own) & BRAINSTORM WAYS TO COMBINE THEM.</p> <table border="0"> <tr> <td> Cars/Trucks/Cycles Planes/Helicopters Trains/Mass Transit Personal Computers Small Electronics Appliances Cameras Speakers/Headphones Lamps Furniture Houses/Buildings Roads Weapons Robotics Prosthetics/Wheel chair Clocks/Watches Games/Video-games/Toys Medicine/Birth Control </td> <td> Silverware/Culinary Tools Plate/Drink-ware Clothing/Shoes Hats/Bags/Accessories Haircut/Nails Tattoos/Piercings Art/Sculpture Musical Instruments Art Supplies Wood/Metalworking Tools Pencils/Pens/Paper Books Animals Germs/Viruses Food/Drink Plants/Trees/Garden Awards/Trophies Currency </td> </tr> </table>		Cars/Trucks/Cycles Planes/Helicopters Trains/Mass Transit Personal Computers Small Electronics Appliances Cameras Speakers/Headphones Lamps Furniture Houses/Buildings Roads Weapons Robotics Prosthetics/Wheel chair Clocks/Watches Games/Video-games/Toys Medicine/Birth Control	Silverware/Culinary Tools Plate/Drink-ware Clothing/Shoes Hats/Bags/Accessories Haircut/Nails Tattoos/Piercings Art/Sculpture Musical Instruments Art Supplies Wood/Metalworking Tools Pencils/Pens/Paper Books Animals Germs/Viruses Food/Drink Plants/Trees/Garden Awards/Trophies Currency																		
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<h3>LOCATION BASED APPROACH</h3> <p>Use this approach If there is a certain community that you are interested in helping (your neighborhood, refugees in Greece, etc), . What struggles does that community have? How can you create something that will help?</p> <table border="0"> <tr> <td> 1. MAKE A LIST HERE OF A FEW COMMUNITIES / GROUPS / PLACES THAT YOU WOULD BE INTERESTED IN HELPING. </td> <td> 2. RESEARCH YOUR CHOSEN COMMUNITY (online, interviews, etc) FOR POTENTIAL PROBLEMS THAT NEED SOLVING. </td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> <tr> <td> (For example a specific nature habitat, local nursing home, etc.) </td> <td> (High costs to feed animals, elderly people feel isolated, etc.) </td> </tr> </table>		1. MAKE A LIST HERE OF A FEW COMMUNITIES / GROUPS / PLACES THAT YOU WOULD BE INTERESTED IN HELPING.	2. RESEARCH YOUR CHOSEN COMMUNITY (online, interviews, etc) FOR POTENTIAL PROBLEMS THAT NEED SOLVING.	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	(For example a specific nature habitat, local nursing home, etc.)	(High costs to feed animals, elderly people feel isolated, etc.)	<h3>THEME BASED APPROACH</h3> <p>Themes help act as a way to give yourself limits so that you don't have to many options. They focus your attention on a concept without stipulating what you should make. This leaves room for creative interpretation.</p> <table border="0"> <tr> <td> Seasons Natural Elements History / Time / Age Metamorphosis Legends / mythology Genders Journeys / Exploration Religion / Theology Anatomy / Movement War / Violence Growth / Plants Dreams / Nightmares Illusions (optical) Emotions Heroes / Villains Power / Strength </td> <td> Monsters / Supernatural Steampunk / Sci-fi Minimalist Death / Entropy Race / Culture Music Genres Art Periods Dance Styles Locations (Urban, country...) Secrets / Hidden / Lost Identity / Self Alien / The Other Types of Food / Beverage Cities / Countries Fate / Destiny Clothing Styles / Textures </td> </tr> </table> <p>YOU CAN FIND MANY MORE THEMES BY SEARCHING ONLINE FOR "LIST OF (PROJECT/ART/WRITING) THEMES".</p>		Seasons Natural Elements History / Time / Age Metamorphosis Legends / mythology Genders Journeys / Exploration Religion / Theology Anatomy / Movement War / Violence Growth / Plants Dreams / Nightmares Illusions (optical) Emotions Heroes / Villains Power / Strength	Monsters / Supernatural Steampunk / Sci-fi Minimalist Death / Entropy Race / Culture Music Genres Art Periods Dance Styles Locations (Urban, country...) Secrets / Hidden / Lost Identity / Self Alien / The Other Types of Food / Beverage Cities / Countries Fate / Destiny Clothing Styles / Textures
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Appendix A - A Simple Guide for Project-Based Learning (cont.)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING

STAGE #1
continued

IDEATION

PART 2 EXPAND YOUR IDEA

WHY?

This one word has the potential to get at the root of the issues surrounding your concept. For instance, let's say your initial concept is to create a way to curb teens using their cell phones so frequently.

Why is it a problem that teens use their cell phones so often?
Why do teens use their cell phones so much?
Why might a teen choose not to use their cell phone as much?
Why are cell phones so addicting?
Why do cell phones exist?

Try asking as many why questions as you can around your idea. Answer these questions with as many possibilities as you can think of. Ask others these questions. This will help generate more possibilities to make your end product more successful.

HOW?

Asking how can begin to solve the questions you posed when asking why. Use what you discovered when answering your why questions and pose them as how questions.

How can we prevent teens from using their cell phones so often?
How might we incentivize/reward students for using their cell phones less?
How can we make not using your cell phone fun?
How could you market the idea of using cellphones less to teens
How can we use what we know about addiction to help curb teen cell phone use?
How can we create more authentic experiences for communicating that don't rely on cellphone?

Your answers to these questions will help you create a solution for your idea that is innovative, rather than something that will try and fail, or an idea that has been tried many times before.

WHAT IF?

Asking what if is another way to adapt and change your idea and gain new incites about how your idea could be created that you may not have thought of before. Try thinking about cause and effect. If we do something to what we are making, how will it effect how it works and how people will interact with it?

What if we made it faster/slower?
What if we made it bigger/smaller?
What if we made it more complex/simpler?
What if we made it last longer/only last a short time?
What if we made it exclusive/super easy to get?
What if we made it durable/fragile?
What if we mass produced it/made it by hand?
What if we made it heavier/lighter?
What if we made it Hot/cold?
What if we made it loud/quiet?
What if we made it Rigid/flexible?
What if we made it cheaper/expensive?
What if we made it futuristic/vintage?
What if we made it rough textured/soft?
What if we made it out of a different material?

Appendix A - A Simple Guide for Project-Based Learning (cont.)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING



FOLLOW THE PROCESS STEPS BELOW

STEP 1 I WANT TO MAKE

Sum up your idea in a few words here.

EXAMPLES:

- A photo series about how different fads have changed over time
- A table made out of only things I would normally throw away or recycle
- A song using only sounds captured in nature and person singing
- A recipe that only uses ingredients that are the color blue

STEP 2 EXPAND ON YOUR IDEA

Write more information about your idea. Describe what interests you about the project and why you chose to pursue this idea. What themes are you exploring and how do they relate to the work you create as a person who makes things?

STEP 3 I PLAN TO FINISH MY PROJECT BY

MONTH

DAY

YEAR

Appendix A - A Simple Guide for Project-Based Learning (cont.)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING	STAGE #2 continued	PROCESS
---	-----------------------	---------

STEP 4 INFLUENCES

Research other artists, content creators, and inventors that are doing work that is similar to the work you are doing. Record these people's names, and info about what you find interesting about their work and what parts of their work you might borrow (appropriate) from the way they make things. Collecting images or samples of their work can also be helpful.

NAME

WHATS INTERESTING/INFLUENCING ABOUT THERE WORK?

Do they have a Website? Have they created any Media (books, music, video, etc)?

Do they have a Website? Have they created any Media (books, music, video, etc)?

Do they have a Website? Have they created any Media (books, music, video, etc)?

STEP 5 NEW TERMINOLOGY

During this project did you learn about any new terms, tools, techniques, computer key commands, tricks, etc? Record them here.

NEW TERMS/TOOLS/ETC	EXPLANATION
EXAMPLE - Shutter Speed	This is how fast a picture is taken. The longer the shutter is open, the brighter your picture will be. Fast shutter speeds such as 1/1000sec freeze motion while Slow ones such as 1/20sec allow motion to blur. With a tripod very slow speeds such as 3"sec can create ghostly images if things move and light/star trails. When shutter speed goes up, aperture or "F-stop" often has to go down to balance the amount of light.

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Appendix A - A Simple Guide for Project-Based Learning (cont.)

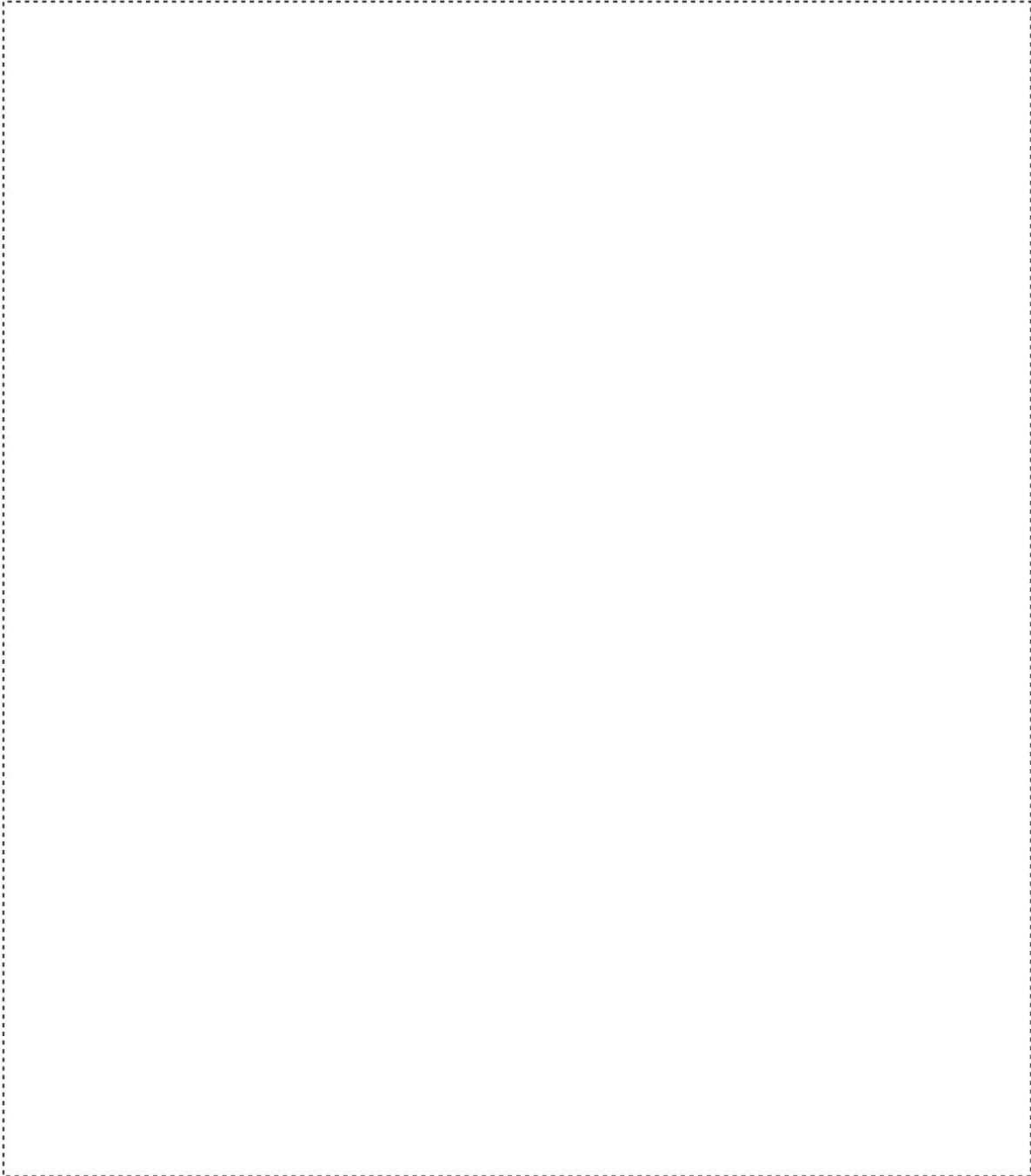
A SIMPLE GUIDE FOR PROJECT BASED LEARNING

STAGE #2
continued

PROCESS

STEP 6 ROUGH SKETCHES

Do some rough sketches of your idea at this point. A sketch might be a few quick drawings, a rough computer program, a music demo or lyrics, ideas for flavor combinations in a recipe, etc. The key is they need to be quick, experimental and help you work out your ideas.

A large, empty rectangular area defined by a dashed border, intended for students to create rough sketches of their project ideas.

Appendix A - A Simple Guide for Project-Based Learning (cont.)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING

STAGE #2
continued

PROCESS

STEP 7 MATERIALS & TOOLS

THINGS TO CONSIDER WHEN GETTING TOOLS & MATERIALS:

TIME - When do I want/need to have my project done? How long will it take to get my supplies? Where am I going to get them? Often this is one of the most time consuming parts of making something and requires planning.

COST - How much will my materials to make my project cost? Can I get them cheaper somewhere else? Who is paying for the materials? If you need to buy the materials you may need to consider fundraising first, or asking for donations. Many times you can find free materials if you are creative. For instance, free wood can often be found in the form of pallets and curbside furniture. You can also often make a project cheaper by simply scaling down the size of it.

TOOLS - Many materials require specialized tools or equipment to work with them. When selecting materials be sure that you will have access to the right tools and software to be successful. Be aware of safety precautions that come along your material as well. You may find a lot of this information during your research step.

QUALITY LEVEL - How nice/finished does my end product need to be? If this is just an early prototype you can probably make it out of a simple materials like cardboard or paper (which will also speed up the process). If the end product needs to have high quality craftsmanship, what materials will I need to get to make sure this is possible?

MATERIALS -&- WHERE ARE YOU GETTING THEM?

QUANTITY COST

TOOLS -&- WHERE ARE YOU GETTING THEM?

QUANTITY COST

Appendix A - A Simple Guide for Project-Based Learning (cont.)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING

STAGE #2
continued

PROCESS

STEP 8 TEST / REVISE / ITERATE

When starting your project you want to work quickly to get a working prototype that you can test. This might be a scale model, sample photos, or full size model made out of simple materials.

Once you have something rough, you can begin to have people try it out give feedback. This will help you make improvements and discover errors that you initially overlooked. Revise based on the feedback you get, fixing the problems you had. Then do the whole process over again. This process is called iteration.

ATTEMPT 1

WHAT DID YOU CREATE?

HOW DID IT GO?

HOW WILL YOU CHANGE IMPROVE IT?

ATTEMPT 2

WHAT DID YOU CREATE?

HOW DID IT GO?

HOW WILL YOU CHANGE IMPROVE IT?

ATTEMPT 3

WHAT DID YOU CREATE?

HOW DID IT GO?

HOW WILL YOU CHANGE IMPROVE IT?

Appendix A - A Simple Guide for Project-Based Learning (cont.)

STEP 9 : PERSONAL REFLECTION

At the end of your project it is important to reflect on the process. Consider what you accomplished, what you learned, what went well, and problems you encountered to avoid in your future projects. Take ownership for your work, and really think about how things went.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

STEP 10 | CHALLENGE CARD

To Show proof that you have synthesized your learning and to encourage others to create work related to yours, create a challenge card at the end of your project. This boils down your project to the base idea and provides influences and imagery to inspire others.

EXAMPLE

Photograph a single type of object repeated many times to create rhythm and pattern. See Photographers Laura Marie (on Flickr) & Mitchel Feinberg for inspiration.



A diagram showing a rectangular box divided into two horizontal sections. The top section is shaded gray and represents the 'Solid' phase. The bottom section is white and represents the 'Liquid' phase. The box is labeled 'Solid' on the left and 'Liquid' on the right.

Appendix A - A Simple Guide for Project-Based Learning (cont.)

A SIMPLE GUIDE FOR PROJECT BASED LEARNING



FOLLOW THE PROCESS STEPS BELOW

NATIONAL CORE ARTS STANDARDS (with language adjusted for PBL)

1. Imagine innovative ideas for your project.
2. Develop your ideas by making multiple drafts, sketches and prototypes.
3. Refine what you have made until the work is well-crafted/finished.
4. Describe your process and identify areas for improvement.
5. Demonstrate how you have improved your skills over time.
6. Consider who is meant to experience your work & justify how it is presented.
7. Reflect on how your work is influenced by a range of other artists/designers/makers.
8. Critically review your work for meaning, effectiveness, and bias.
9. Seek feedback about your work from multiple people and points of view.
10. Express your personal ideas and point of view in your work.
11. Combine cultural, social, & historical ideas in new ways in your work.

DID YOU COLLECT RESEARCH ABOUT PROJECTS WITH SIMILAR THEMES?

VISUAL EXAMPLES / WRITTEN RESOURCES / VIDEO / AUDIO
NUMBER OF SOURCES 1 / 2 / 3 / 4 / 5 / 6+

HOW DOES YOUR PROJECT COMPARE TO OTHERS IN TERMS OF CRAFT?

LEVEL OF CRAFT MASTERY / HIGH / MEDIUM / LOW

HAVE YOU DOCUMENTED THE WHOLE PROCESS OF CREATING YOUR PROJECT?

IDEATION NOTES & MIND MAPPING / SKETCHES / RESEARCH
 DRAFTS & VERSIONS / FINAL PROJECT & PRESENTATION

DID YOU GET AND IMPLEMENT CONSTRUCTIVE FEEDBACK?

NUMBER OF PEOPLE 1 / 2 / 3 / 4 / 5 / 6+
ALL FEEDBACK USED/CONSIDERED? YES NO

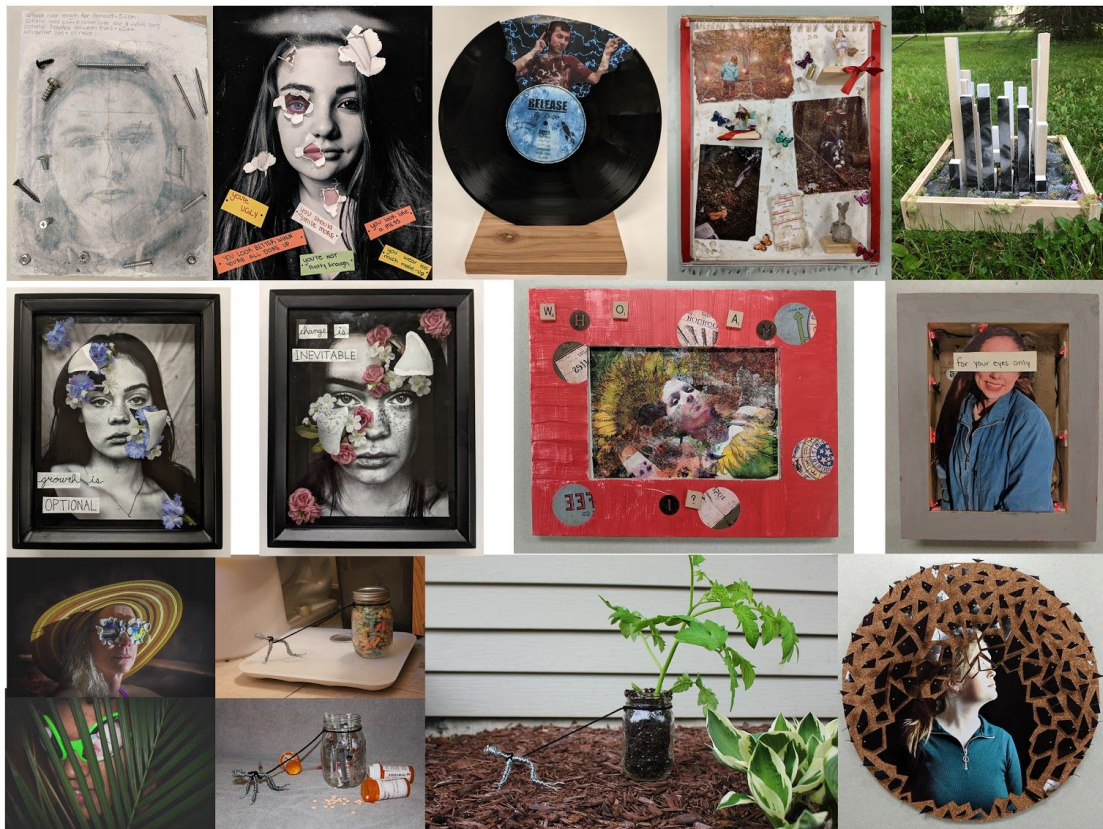
DID YOU IMPROVE FROM PAST WORK?

IMPROVEMENT IN CRAFT / CREATIVITY / EDITING
 STORYTELLING & COMMUNICATION / TECHNIQUES

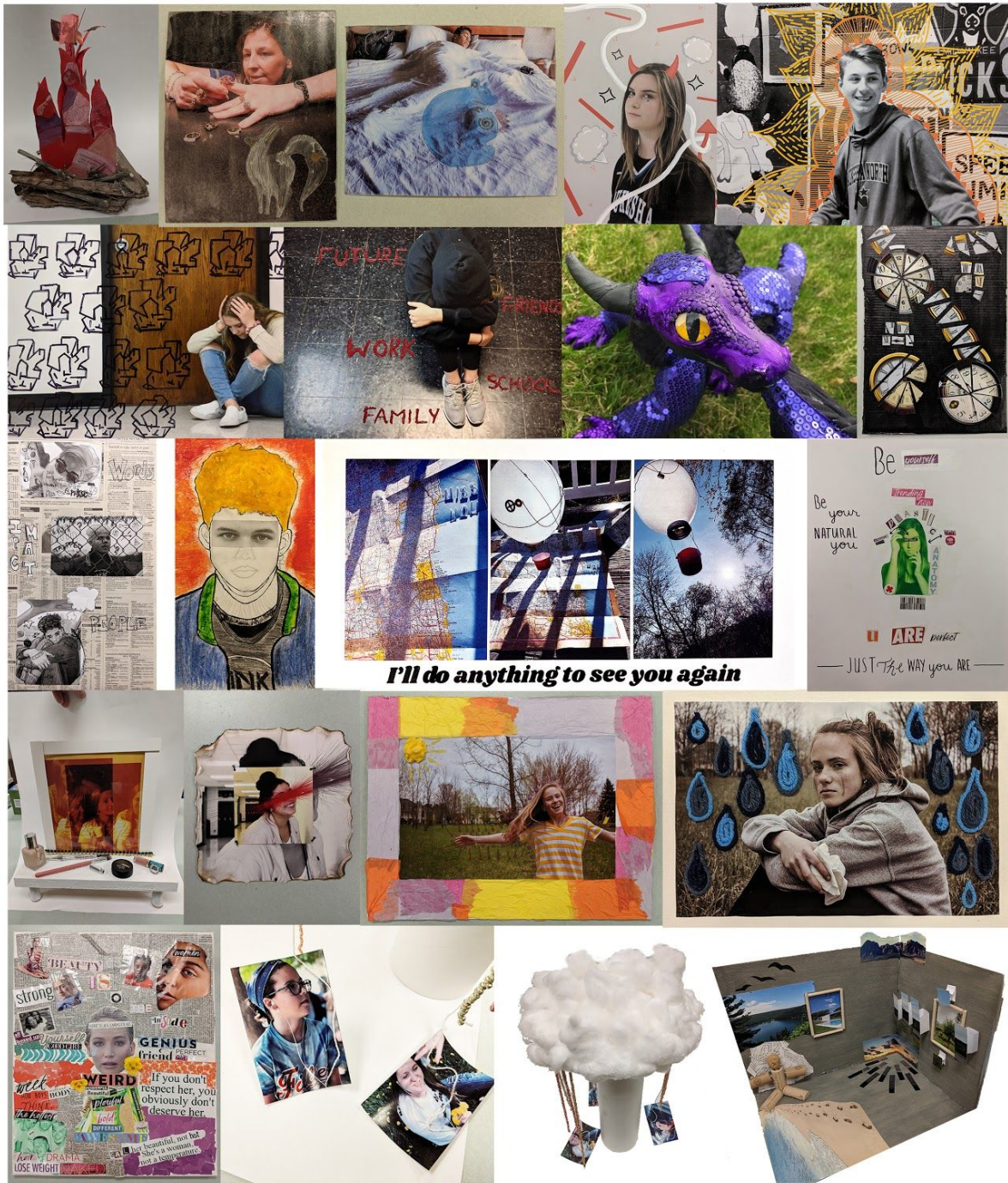
WHAT STILL NEEDS IMPROVEMENT?

NEEDS WORK CRAFT / CREATIVITY / EDITING
 STORYTELLING & COMMUNICATION / TECHNIQUES

Appendix B - Images That Demonstrate High Quality Student Work



Appendix C - Images That Demonstrate Medium Quality Student Work

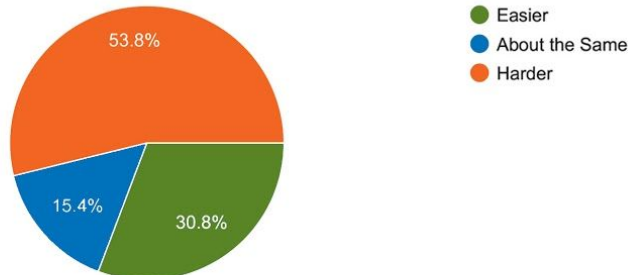


Appendix D - Images That Demonstrate Low Quality Student Work

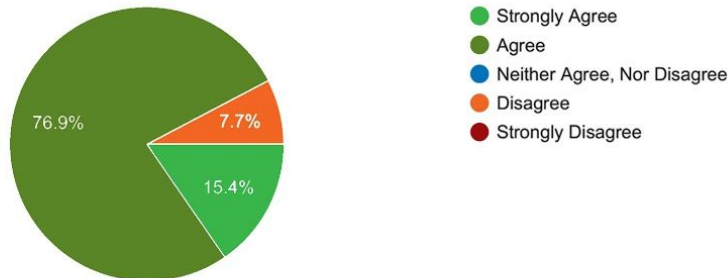


Appendix E - Student Survey Response Data Visualizations

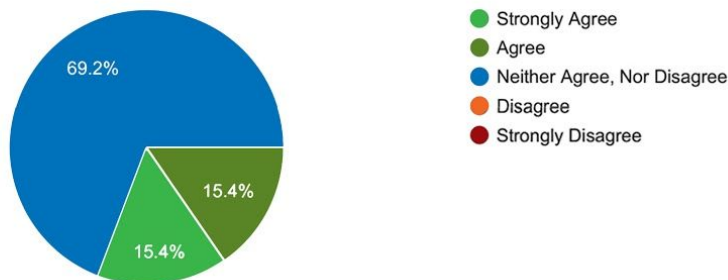
If you were required to do a large project without this guide, but you were still required to document your process from beginning to end, do you think it would be easier or harder?



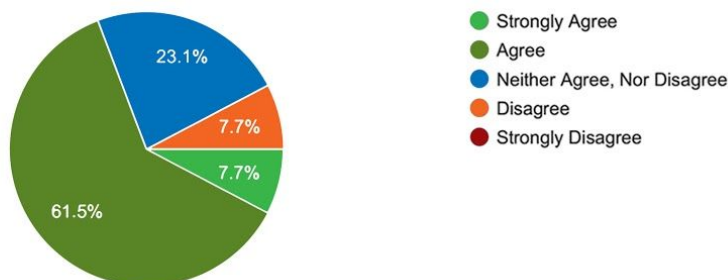
I feel that the PBL Guide helped direct me through the steps of documenting and organizing my project from beginning to end?




I feel like the PBL guide helped improved your final product?



I think the PBL Guide would be helpful for projects in many different content areas? (ie, fine art, design, engineering, woodworking, etc)



**TAKEOFF**

WELCOME! THIS WEBSITE IS A HUB FOR CREATING PROJECTS

**NEED AN IDEA? TRY OUR IDEA GENERATOR
OR GET INSPIRED BY OUR PROJECT GALLERY**

[TAKE ME TO THE IDEA GENERATOR](#)

[TAKE ME TO THE PROJECT GALLERY](#)

-OR- START BY NAMING YOUR FIRST PROJECT


PROJECT NAME


UPLOAD A PROJECT COVER PHOTO...


[FROM MY COMPUTER](#)

[FROM A WEB URL](#)

NEXT >

**HOME**


**IDEAS**

**GALLERY**


[+ NEW](#)

ORDER BY


DATE



**THE SKULL OIL
PAINTING PROJECT**

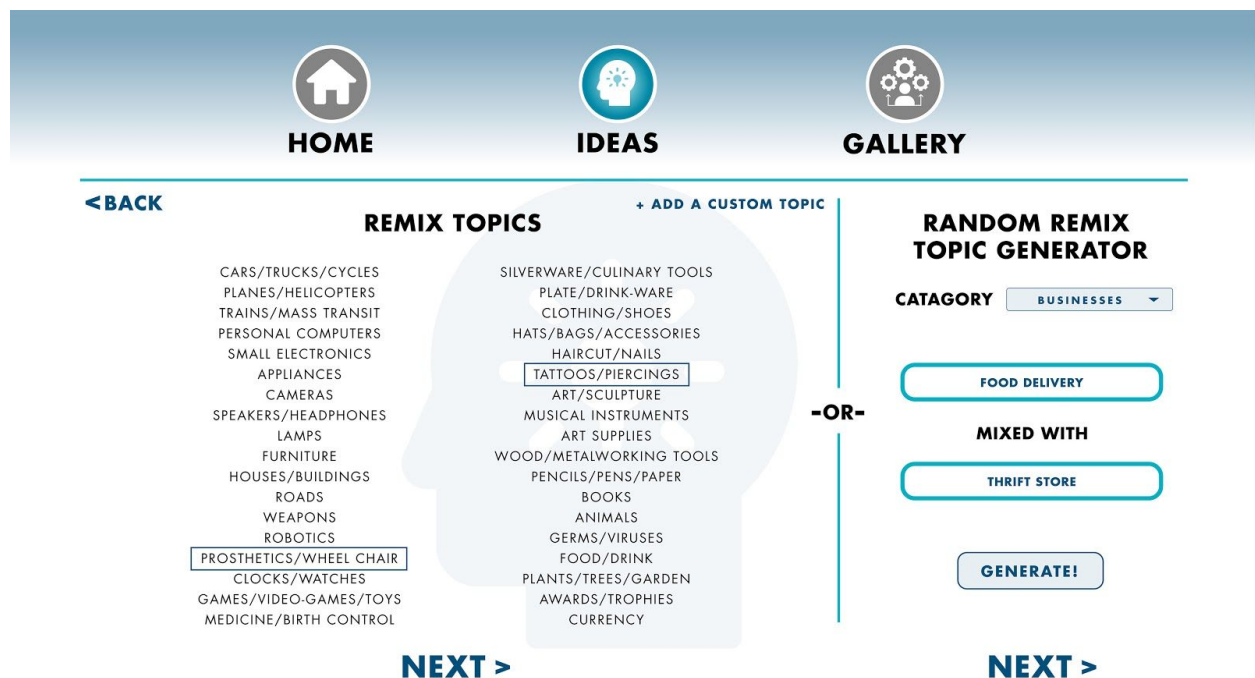


**THE NEW
EARTH PROJECT**



UNTITLED

Mockup of Iterated Digital PBL Guide (cont.)



Mockup of Iterated Digital PBL Guide (cont.)

HOME

IDEAS

GALLERY

<BACK

REMIX BRAINSTORM

PROSTHETICS/WHEEL CHAIR

+

TATTOOS/PIERCINGS

CARACTERISTICS

-Rigid

-Standardized

-Accessibility Issues

-Lack Of Artistic Customization

-Stigma, Viewed As Less Than

-Mechanical

-Modular

-Uncomfortable

-Industrial

-Vets

-Metal

-Removeable

CARACTERISTICS

-Colorful

-Painful

-Counter-Culture

-Viewed as Positive/Negative

-Removeable, Customizable

-Expressive

-Meaningful

-Tough

-Individualistic

-Earned

-Permenemt

-Needles

-Cultural

Use the space below to expand on your ideas. How could these two areas be brought together to make a new product or art-work? How can you use the characteristic of one topic to reinforce or accentuate the other? What could you make?

Click here to see [EXAMPLES](#) of this step.

SKETCH

TAT DESIGN ON CHAIR BACK

TAT INSPIRED CUTOUT

REMOVABLE SLEEVES WITH TATS FOR PROSTHETIC LEGS

-OR- UPLOAD A FILE...

VIDEO

AUDIO

PHOTOS

TEXT

MISC

PROJECT NAME

UPLOAD A PROJECT COVER PHOTO...

FROM MY COMPUTER

FROM A WEB URL

PROCEED TO PROJECT HOME >

HOME

IDEAS

GALLERY

Woodworking

ORDER BY

RELEVANCE

BENT WOOD COMPUTER STAND

POSTED BY: WOODGUY23

★★★★★

MAKE A STACKED PLYWOOD TABLE & CHAIR SET

POSTED BY: LEROYJENKINS!

★★★★★

DIY WOOD AND STEEL BAR STOOLS

POSTED BY: ILIKESQUIRELS19

★★★★★

FROM RECLAIMED WOOD TO CONVERSATION LAMP!

POSTED BY: ITBELIKETHATSONETIMES123

★★★★★

CLASSY MINIMALIST BEDSIDE TABLE

POSTED BY: TIKITIKIKIROOM3

★★★★★

CUSTOM WOODEN SHUTTERS FOR YOUR WINDOWS

POSTED BY: FOURTYFOUR445

★★★★★

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Mockup of Iterated Digital PBL Guide (cont.)

THE NEW EARTH PROJECT

PREFERENCES

HOME

PLAN

RESEARCH

MATERIALS

NOTES

DOCUMENT

ASSESSMENT

PLAN

4 of 4 STEPS COMPLETE

RESEARCH

3 RESOURCES SAVED

MATERIALS & TOOLS

3 MATERIALS 2 TOOLS

CHOOSE A PROJECT PRESENTATION TEMPLATE

NOTES

3 NOTES SAVED

DOCUMENT

6 DOCUMENTS SAVED

ASSESSMENT

1 REFLECTION / 6 REVIEWS

VIEW/EDIT PROJECT PRESENTATION

THE NEW EARTH PROJECT

PREFERENCES

HOME

PLAN

RESEARCH

MATERIALS

NOTES

DOCUMENT

ASSESSMENT

PROJECT PRESENTATION TEMPLATES

THE NEW EARTH PROJECT

The New Earth Project

THE NEW EARTH PROJECT

THE NEW EARTH PROJECT

THE NEW EARTH PROJECT

The New Earth Project

THE NEW EARTH PROJECT

THE NEW EARTH PROJECT

Mockup of Iterated Digital PBL Guide (cont.)

THE NEW EARTH PROJECT

PREFERENCES

PLAN

RESEARCH

MATERIALS

NOTES

DOCUMENT

ASSESSMENT

CHOOSE A TOPIC TO MAKE:

PLAN - STEP 1 OF 4

2D ART	CLOTHING	FOOD/DRINK	WRITING
3D ART	FURNITURE	ARCHITECTURE	FILM
DESIGN	KITCHENWARE	HARDWARE	LIGHTING
MUSIC	BEDDING	SOFTWARE	OTHER

NEXT >

THE NEW EARTH PROJECT

PREFERENCES

PLAN

RESEARCH

MATERIALS

NOTES

DOCUMENT

ASSESSMENT

<BACK

PLAN - STEP 2 OF 4

REFINE YOUR TOPIC:

3D ART

WOOD

GLASS

PAPER

FABRIC/LEATHER

METAL

PLASTIC

CLAY

STONE

CEMENT

LIGHT

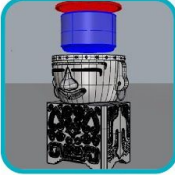

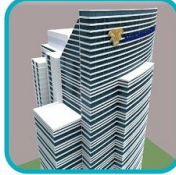



VIRTUAL 3D MODEL

FOUND OBJECT

INSTALLATION

A VIRTUAL 3D MODEL can be made of almost anything using a 3D modeling program such as Blender, MAYA, Autodesk Inventor, Sketchup, etc. The model can then be used for visualization, animation, film FX, a video game, 3D printing, and more.

EXAMPLE - 3D MODELS

NEXT >

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Mockup of Iterated Digital PBL Guide (cont.)

THE NEW EARTH PROJECT

PREFERENCES

PLANRESEARCHMATERIALSNOTESDOCUMENTASSESSMENT

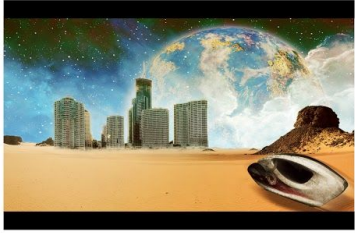
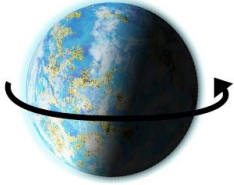
<BACKPLAN - STEP 3 OF 4

WHAT KIND OF **VIRTUAL 3D MODEL** DO YOU PLAN TO MAKE?

HUMANOID CHARACTER
CREATURE
INTERIOR ROOM
EXTERIOR STRUCTURE
LANDSCAPE
PLANET
EVERYDAY OBJECT
VEHICLE
TOOL
OTHER

WHAT DO YOU PLAN TO USE YOUR **VIRTUAL 3D MODEL** FOR?

VISUALIZATION
ILLUSTRATION
ANIMATION
FILM SPECIAL FX
3D PRINT
VIDEO GAME



NEXT >

THE NEW EARTH PROJECT

PREFERENCES

PLANRESEARCHMATERIALSNOTESDOCUMENTASSESSMENT

<BACKPLAN - STEP 4 OF 4

I WILL BE CREATING A **VIRTUAL 3D MODEL** OF A **PLANET** FOR AN **ANIMATION**.

Use the space below to elaborate on your idea. Explain more about what role the **VIRTUAL 3D MODEL** of a **PLANET** will play in your **ANIMATION**. What should the model look and act like and why? Does the model need to move (rigging) or will it be a static element? What part will the model play in the animations STORY? What THEMES does the animation include?

[Click here to see EXAMPLES of this step.](#)

-OR- UPLOAD A FILE...

VIDEO

AUDIO

PHOTOS

TEXT

MISC

NEXT >

Mockup of Iterated Digital PBL Guide (cont.)

THE NEW EARTH PROJECT

HOME PLAN RESEARCH MATERIALS NOTES DOCUMENT ASSESSMENT

RESEARCH - 0 INFLUENCES SAVED


(RE)SEARCH

What Modeling Program do you plan to use? SELECT PROGRAM HERE

SUGGESTED RESEARCH MATERIALS


WEBSITES VIDEOS IMAGES AUDIO TEXTS

3D MODELING BASICS




04:37

ANIMATION BASICS




07:11

PLANETARY MOTION




11:26

SCI-FI CONCEPT ART




13:00

Creating 3d Models.




12:31


HOW TO ANIMATE LIKE A PROFESSIONAL



14:07



08:42



02:37

THE NEW EARTH PROJECT

HOME PLAN RESEARCH MATERIALS NOTES DOCUMENT ASSESSMENT


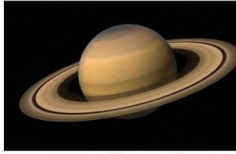


RESEARCH - 0 RESOURCES SAVED



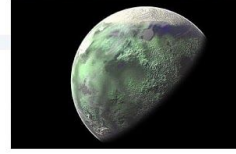

Realistic 3D Model Planet

What Modeling Program do you plan to use? BLENDER

SUGGESTED (RE)SEARCH SOURCES

WEBSITES VIDEOS IMAGES AUDIO TEXTS

Mockup of Iterated Digital PBL Guide (cont.)

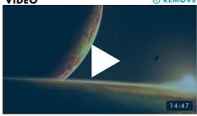
THE NEW EARTH PROJECT

PLAN RESEARCH MATERIALS NOTES DOCUMENT ASSESSMENT

<BACK RESEARCH - 3 RESOURCES SAVED + THIS RESOURCE IS SAVED

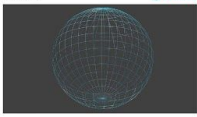
SAVED RESOURCES

VIDEO REMOVE




NOTES ABOUT THIS RESOURCE

IMAGE REMOVE




NOTES ABOUT THIS RESOURCE

WEBSITE REMOVE



Blender Genius
www.blendergenius.com>tutorials
How to Make A Planet (EVEE)
Feb 14, 2020 - Uploaded by Blender Genius

NOTES ABOUT THIS RESOURCE



THE NEW EARTH PROJECT

PLAN RESEARCH MATERIALS NOTES DOCUMENT ASSESSMENT

MATERIALS - STEP 1 OF 2

WHAT MATERIALS WILL YOU NEED TO MAKE YOUR PROJECT?

SUGGESTED MATERIALS CLICK THIS ICON TO FIND OUT MORE ABOUT A MATERIAL OR TOOL CONSUMABLE

TILEABLE TEXTURE ?

TEXTURE MAPS ?

PAPER & PENCIL ?

DIGITAL STORAGE ?

HDR FOR IMAGE LIGHTING ?

3D FILAMENT ?

IMAGE REFERENCES ?

+ CUSTOM ?

WHAT TOOLS WILL YOU NEED TO MAKE YOUR PROJECT?

SUGGESTED TOOLS

3D MODELING COMPUTER ?

3D MODELING PROGRAM ?

3D PRINTER ?

+ CUSTOM ?

NEXT >

Mockup of Iterated Digital PBL Guide (cont.)

THE NEW EARTH PROJECT

PLAN
RESEARCH
MATERIALS
NOTES
DOCUMENT
ASSESSMENT

<BACK
MATERIALS - STEP 2 OF 2

MY MATERIAL LIST:

TILEABLE TEXTURE

APPROX. COST
(per item)

ACTUAL COST
\$1.50

LINKS TO ACQUIRE MATERIAL:

FREE 1
FREE 2
FREE 3

PAY 1
PAY 2
PAY 3

NOTE

HDR (FOR IMAGE LIGHTING)

APPROX. COST
(per item)

ACTUAL COST
\$0

LINKS TO ACQUIRE MATERIAL:

FREE 1
FREE 2
FREE 3

PAY 1
PAY 2
PAY 3

NOTE

PAPER & PENCIL

APPROX. COST
(per item)

ACTUAL COST
\$12

LINKS TO ACQUIRE MATERIAL:

FREE 1
FREE 2
FREE 3

PAY 1
PAY 2
PAY 3

NOTE

+ ADD A MATERIAL

TOTAL
\$16.50

MY TOOLS LIST:

3D MODELING COMPUTER

APPROX. COST
(per item)

ACTUAL COST
\$2000

LINKS TO ACQUIRE MATERIAL:

PAY 1
PAY 2
PAY 3

PAY 4
PAY 5
PAY 6

NOTE

3D MODELING PROGRAM

APPROX. COST
(per item)

ACTUAL COST
\$0

LINKS TO ACQUIRE MATERIAL:

FREE 1
FREE 2
FREE 3

PAY 1
PAY 2
PAY 3

NOTE

BLENDER

+ ADD A TOOL

TOTAL
\$2000

NEXT >

THE NEW EARTH PROJECT

PLAN
RESEARCH
MATERIALS
NOTES
DOCUMENT
ASSESSMENT

+ NEW NOTE

NOTES

BLENDER GENIUS TUTORIAL VIDEO

+

PLANET VECTOR IMAGE

+

BLENDER GENIUS TUTORIAL WEBSITE

+

REPEATING PATTERN IMAGE TEXTURE

HDR FOR IMAGE LIGHTING

+

PAPER AND PENCIL

MISCELLANEOUS NOTE ON 3D ROTATION

+

3D COMPUTER RIG

RESEARCH

BLENDER GENIUS TUTORIAL VIDEO

1 Video
2 Images
600 Words

MATERIAL

HDR FOR IMAGE LIGHTING

1 Image
1 Websites
100 Words

MISC.

3D ROTATION

2 Websites
300 Words

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THE NEW EARTH PROJECT



PLAN

RESEARCH

MATERIALS

NOTES

DOCUMENT

ASSESSMENT

PREFERENCES

BACK TO NOTES



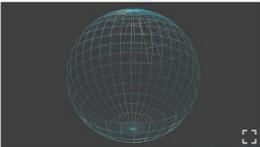
RESEARCH

BLENDER GENIUS
TUTORIAL VIDEO

1 Video

2 Images

600 Words



NOTE

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Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi.

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Mockup of Iterated Digital PBL Guide (cont.)

THE NEW EARTH PROJECT

HOME

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DOCUMENT

ASSESSMENT

+ DOCUMENT

Having good documentation of the full process used to make your project and multiple versions of the final product is recommended as a resource for future projects, building tutorials, and to help others assess what you have made.

FINAL DOCUMENTATION

IMAGE

VERSION 3

IMAGE

FINAL ID

VIDEO

TUTORIAL

VERSION 3

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt et laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis auteem vel eum iure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et justo odio dignissim qui blandit praesent luptatum zzril delenit augue duiis dolore feugiat nulla facilisis.

THE NEW EARTH PROJECT

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ASSESSMENT

Click here to see [EXAMPLES](#) of this step.

REFLECTION

ASSESSMENT - STEP 1 OF 3

At the end of a project it is important to REFLECT about the process of making it. Consider...

-What went well with the project?

-What will you do differently next time?

-What did you learn?

-What are the ideas behind the project?

-What themes does your project explore

-How do users/viewers react to the piece?

-Is this reaction what you hoped for (why or why not)?

-Could anything be changed/iterated to get a better reaction?

-Where could your idea evolve to from here?

NEXT >

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THE NEW EARTH PROJECT

PLANRESEARCHMATERIALSNOTESDOCUMENTASSESSMENT

<BACKSELF REVIEWASSESSMENT - STEP 2 OF 3

IMPROVEMENT	REALISM	+ CUSTOM FIELD
<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>
CRAFTSMANSHIP	RESEARCH	+ CUSTOM FIELD
<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>
DETAIL	REFLECTION	+ CUSTOM FIELD
<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>

NEXT >

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Appendix G - IRB Paperwork



View xForm - New Study Form

Use this form when submitting a new study to the IRB.

New Study data entry

A. Study Title

Submitted by:	Driscoll, Michael		
Email:	mldjr@uwm.edu	Phone:	

A. SECTION NOTES:

- To give another user access to this form for reviewing, editing or submitting, select the "**Collaborators**" option at the top of any page. If appropriate, please add any collaborators as PI, SPI and/or other contact in Section B because this will not be done automatically. For more detailed instructions about collaboration, please click [here](#).
- Each Section must be completed unless directed otherwise. Incomplete forms will delay the IRB review process.

A1. Full Study Title:

A Student-Driven Guide for Project Based Learning

- Study title must be the same on all study documents (e.g., consents, advertisements, grants, etc.). If not, a reason must be given. Click on the "Add Note" above and explain (e.g., deception study, simplified title).
- Mismatched titles between what the IRB approves and what is on the grant application may delay funding.

B. PI and SPI and Other Contact

B. SECTION NOTES:

- To give another user access to this form for reviewing, editing or submitting, select the "**Collaborators**" option at the top of any page. If appropriate, please add any collaborators as PI, SPI and/or other contact in Section B because this will not be done automatically. For more detailed instructions about collaboration, please click [here](#).
- IRB correspondence (e.g., Approval Letters, IRB revisions, etc.) will be sent to the email addresses listed under the PI and contact person (B1 and B3).
- Only UWM faculty and staff may be listed as PI in B1. Students may be listed as a Student PI in B3.
- The PI and SPI are required to complete Human Subjects Research training. Please visit the UWM IRB website for more details: <http://uwm.edu/irb/training/human-subjects-training-citi/>

IRB Paperwork (cont.)

B1. Principal Investigator (P.I.) (UWM faculty and staff only. Students may NOT serve as the PI.):

Entered: 07/15/19 **By:** Cosier, Kimberly

my phone number is 414 704 3931

Cosier, Kimberly

Email: kcosier@uwm.edu **Phone:**

- You must enter the full UWM email address including the @uwm.edu. If the person is not found, they must be added to IRBManager as a new user. The individual may automatically create a new user account by logging into IRBManager with his/her UWM Panther ID and password or by registering for a new account on the UWM IRB website:
<http://uwm.edu/irb/irbmanager/>

- If you are not the PI, you may give the PI access to this form for reviewing, editing or submitting by selecting the "**Collaborators**" option at the top of any page. For more detailed instructions about collaboration, please click [here](#).

B2. Department, School, or College

Entered: 07/15/19 **By:** Cosier, Kimberly

Art and Design, Peck School of the Arts

Art Education

B3. Student Principal Investigator (S.P.I.) and/or Other Contact than PI. These individuals will be notified on all IRB notifications. Be sure to list the submitter of the form.

Driscoll, Michael

Email: mldjr@uwm.edu **Phone:**

- You must enter the full UWM email address including the @uwm.edu. If the person is not found, they must be added to IRBManager as a new user. The individual may automatically create a new user account by logging into IRBManager with his/her UWM Panther ID and password or by registering for a new account on the UWM IRB website:
<http://uwm.edu/irb/irbmanager/>

- If you are not the Student PI or other contact, you may give the SPI or other contacts access to this form for reviewing, editing or submitting by selecting the "**Collaborators**" option at the top of any page. For more detailed instructions about collaboration, please click [here](#).

IRB Paperwork (cont.)

B4. Enter the names of Co-Investigators and research personnel not listed in B3 and their role in the project. If study personnel are not affiliated with UWM, identify their institutional affiliation and their role in the project.

Entered: 07/15/19 By: Cosier, Kimberly

N/A

No answer provided.

- These individuals will not receive IRB notifications or have access to this study's information in IRBManager.

B5. Is this project being conducted as part of a student project, dissertation, or thesis? (If the student should have access to this study in IRBManager, please list in Section B3.)

Yes

C1. Review Type and Minimal Risk

C1.1 Select the type of research this project best falls under:

b. Educational

Social & Behavioral: Research that deals with human attitudes, beliefs, and behaviors. Studying the neurology, anatomy, and physiology that underlies perception, learning, instinctual behavior, and emotional responses. Includes behavioral and psychological interventions.

Educational: Research in educational settings involving educational practices. For example: research on regular and special education instructional strategies; effectiveness or comparison among instructional techniques, curricula, or classroom management methods.

Biomedical: Research designed to evaluate the safety, effectiveness, or usefulness of a medical intervention; diagnostic procedures; preventive measures; specific disease processes; human functioning and development; and human genome and genetic markers.

Health Services: Research on how social, financial, and organizational factors, affect access and/or delivery of health care.

IRB Paperwork (cont.)

C1.2. Please select the risk level of the study.

Minimal Risk

● **"Minimal Risk"** is when the probability and magnitude of harm or discomfort anticipated in the proposed research are not greater, in and of themselves, than the harm and discomfort ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.

● For example, the risk of drawing a small amount of blood from a healthy individual for research purposes is no greater than the risk of doing so as part of routine physical examination, so this activity would be minimal risk.

● Most survey, interview, oral history, focus group, and program evaluations are considered no greater than minimal risk. However, in some circumstances asking questions about illegal activities (such as drug use) or private and sensitive activities (such as sexual behavior) may involve more than minimal risk and require full board review.

● Studies involving x-ray emitting equipment or devices without FDA approval are considered more than minimal risk and require full board review.

● Activities that may be considered minimal risk for healthy adults may involve more than minimal risk for some populations (such as children, pregnant women, prisoners, cognitively impaired adults, or elderly).

C2. Exempt or Expedited

C2. SECTION NOTES:

● Select the review type and category (more than 1 category may be selected) you believe the study falls into. Upon review, the IRB office may change the requested type of review.

● The most common Exempt Categories for social science studies are 1 (educational settings) and 2 (surveys, interviews, and observations). Studies involving surveys and/or interviews with minors WILL NOT qualify for exempt review. To help determine if your study qualifies for Exempt Status, see the checklist the IRB Reviewer uses.

● The most common Expedited Categories for social science studies are 5 (secondary data analysis) and 7 (interviews and surveys). To help determine if your study qualifies for Expedited Status, see the checklist the IRB Reviewer uses.

IRB Paperwork (cont.)

C2.1. Exempt Review. For a project to qualify for Exempt Review, all of the project's activities must fall under one or more of the following categories and cannot be more than "minimal risk." Select all that apply.

Category 1 - Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

Category 2 - Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

C2.2. Expedited Review. For a project to qualify for Expedited Review, all of the project's activities must fall under one or more of the following categories and cannot be more than "minimal risk." Select all that apply.

Category 7 - Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

D. funding details

D. SECTION NOTES:

- Federally funded studies (e.g., NIH, CDC, NSF, etc.) require IRBs to review the grant application for consistency in human subject interaction/intervention and protections. You will be prompted to attach the grant application in Section Y5 of this form.

D1. This study's funding source is or will be: (Select all that apply.)

f. NOT FUNDED

D2. Provide the funding agency's name and address. Enter N/A if the study is not funded.

N/A

D3. UWM Proposal/ grant # (if applicable):

N/A

E. study locations data entry

E1. Describe the location(s) where study activities will take place.

Waukesha North High School

IRB Paperwork (cont.)

E2. Will any of your research occur outside the US?

No

If yes, complete the International Research Supplemental Form and attach in section Y7.

For guidance on international research, see our website.

SECTION NOTES:

● **IMPORTANT:** Projects involving non-UWM investigators, facilities, and/or patients, students, employees (for example, MCW, Aurora, Marquette University, etc.) may require that institution's IRB review. Please contact the collaborating performance site **BEFORE** submitting to UWM to determine whether the site requires any additional review/approval. If this is not done, delays in reviewing the study may occur. If another site requests to have a single IRB of Record (also called a deferral), please contact the UWM IRB office for guidance.

● If the project has received IRB approval from another institution, attach a copy of the IRB approval letter in Section Y7.

● Projects taking place at Milwaukee Public Schools require additional review/approval. Visit MPS site.

● For international research, check local requirements for ethics/regulatory review and approval.

E3. Please describe any other institutional reviews that are needed for this study. If none, state N/A. If you have any documentation from other institutions, please attach in Section Y.

N/A

F. study involvement

F1. This study involves the following activities/articles (select all that apply):

D. Observations

E. Audio/Video Recording, Photos

● Internet Research is subject to additional guidelines. See IRB website.

● Ionizing radioactive materials or radiation producing devices located here on campus requires the review and approval from the Radiation Safety Program. See Radiation Safety website.

F1a. Specify Other

Surveys of participants

G. Informed Consent

IRB Paperwork (cont.)

SECTION NOTES:

Obtaining and documenting subject's signed (can be written or electronic) informed consent is required.

Consent forms must include elements such as the purpose of the study, study procedures, risks, benefits, alternatives, confidentiality, researcher and IRB contact information and the voluntary rights of the participant. The UWM IRB has several consent templates available on the UWM IRB website that researchers may use for guidance. Please attach consent form(s) in Section Y3.

A request to waive obtaining, altering or documenting consent may be granted if justified. The different types of consent waivers are explained below. To request a Waiver, please complete the Waiver to Obtain/Document/Alter Consent Request Form and attach it in section Y3.

I. A **waiver to obtain informed consent** can be requested for studies with no direct contact or involvement with human subjects. Examples:

- secondary analysis of identifiable dataset;
- reviewing a large number of patient charts; and
- research on identifiable specimens

II. A **waiver to alter the required elements of the informed consent** means that consent is still obtained. However, the consent does not contain all the required elements (<http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm#46.111>). Examples:

- Not disclosing the true purpose (a required element) of the study in the consent document because it may bias what is being tested.

III. A **waiver to document informed consent** can be requested for studies where the subject's signature is not obtained. Waiving documentation still requires that a written consent document be presented to the subject. However, the subject's signature is not obtained. Most often, the subject is presented with a consent letter (on computer screen or on paper) explaining that by clicking the "continue button" or completing and returning the survey they are consenting to participate. Examples:

- anonymous survey conducted on paper and pencil;
- confidential online survey; and
- studies where privacy and confidentiality would be compromised by having a signed document linking the subject to the study. E.g., interviews on illegal activities or HIV status

IV. A request to **obtain verbal consent** for **Exempt** research will require the IRB to approve a summary/script of what is to be said to the subject. Example:

- cases where subjects are not able to receive a written consent ahead of time, such as a random digit dialing for telephone surveys where subjects are read a brief consent script

V. A request to **obtain verbal consent** for **Expedited and Full Board** research will require: (1) the IRB to approve a summary/script containing the required elements of consent that is to be verbally presented to the subject, (2) a witness to the verbal presentation of this information, (3) the subject signs a brief document giving consent for participation, (4) the witness signs both the brief document and the summary/script, (5) the researcher obtaining consent signs the summary/script, (6) the researcher keeps all signed documents (summary/script signed by witness and researchers, and brief document signed by witness and subject), and (7) the subject keeps copies (either signed or unsigned) of the brief document. Examples:

- subject populations where many are illiterate;
- it is against one's culture to sign one's name to a document

IRB Paperwork (cont.)

G1. How will the consenting of subjects take place? Please attach the consent form(s) and/or the Waiver to Obtain/Document/Alter Informed Consent Request Form in Section Y3.

e. Assent for minors. Use IRB Assent Template with separate parent consent or combined parent consent/child assent template. Attach in Section Y3.

*Click here to access:
IRB consent templates*

Waiver to obtain/document/alter informed consent Request Form

SECTION H: HIPAA and Conflicts of Interest

H: Health Information Privacy & Accountability Act (HIPAA) and Protected Health Information (PHI)

What is it?

The Health Information Portability and Accountability Act (HIPAA) Privacy Rule is Federal legislation which regulates the way certain health care groups, organizations, or businesses, handle the individually identifiable health information known as protected health information (PHI). The Privacy Rule establishes the conditions under which covered entities can use or disclose PHI for many purposes, including for research. Researchers seeking to use PHI from a UWM Covered Department or an external covered entity as part of their research study must comply with HIPAA. Compliance typically requires either obtaining a HIPAA Authorization during the informed consent process or obtaining a Waiver of such Authorization from the IRB.

What is PHI?

Protected health information (PHI) includes information relating to an individual's past, present or future physical or mental health or condition, the provision of health care services or the past, present or future payment for such services. It only covers information that is individually identifiable. There are 18 identifiers under the Privacy Rule, some of which include: names, dates, geographic locations, telephone numbers, medical record numbers, account numbers, biometric identifiers, and other unique identifying number or code.

If you are asking a participant to self-report his medical history outside a UWM covered department or a clinical/hospital setting and do not wish to see his/her medical record, the information is not considered PHI under HIPAA.

What are UWM's Covered Departments?

UWM is considered a "hybrid entity" under HIPAA because it has some departments and units that are covered by HIPAA and some that are not. All employees and volunteers in UWM's Covered Departments must comply with the Privacy and Security Rules, including in connection with research.

UWM's Covered Departments are currently comprised of the following entities:

A. Provider Units:

1. Community Audiology Services (College of Health Science)
2. Institute for Urban Health Partnerships (College of Nursing)

B. Administrative Units:

- a. Privacy Officers for Covered Departments (See current List of UWM's Privacy Officers.)
- b. UITS Selected Support Staff (Division of Finance & Administrative Affairs)
- c. Other (Non-UIITS) IT personnel serving Covered Departments
- d. Internal Audit (Division of Finance & Administrative Affairs)
- e. Office of Legal Affairs (Division of Finance & Administrative Affairs)
- f. Risk Management (Division of Finance & Administrative Affairs)

Who do I contact to for more information on this?

Contact the UWM Office of Legal Affairs (<https://www4.uwm.edu/legal/hipaa/>)

IRB Paperwork (cont.)

H1. Based on the information above, are you conducting this research as part of a UWM HIPAA covered department AND using Protected Health Information (PHI)?

No

H2. Based on the information above, are you conducting this research outside of a UWM HIPAA covered department but using Protected Health Information (PHI) from a HIPAA covered entity (either at UWM or another institution)?

No

If you answered YES to H1 or H2, you must:

1. Obtain authorization from Research Participants using an "Authorization Form for Research For the Use and Disclosure of Patient Health Information" OR Combine the authorization language in the consent form OR The IRB must approve a request to waive authorization by completing the "Application for IRB Waiver of Authorization or Altered Authorization under the HIPAA Privacy Rule." Please attach in section Y3.
2. Complete online HIPAA training at <https://www4.uwm.edu/legal/hipaa/training/login/>.
3. If you are collecting PHI from a non-UWM HIPAA covered entity, you should verify from that institution if any additional approvals or forms are needed.

H. Conflicts of Interest

When researchers are involved with commercial ventures, there is the potential for diverting from their primary mission of research and education. Conflicts of interest can arise when the interests of the commercial venture differ from the interests and primary obligations of the researcher, or when the commercial venture consumes an undue share of employee time. Please visit the UWM Graduate School website for more details regarding the Conflict of Interest Policy and procedures: <http://www.graduateschool.uwm.edu/research/data-policy/phs-conflicts-of-interest/>

**H3. Please describe any potential conflict of interest key personnel involved in the proposed research activity may have that requires disclosure?
(If none, please state N/A.)**

N/A

Y: Attachments

Y1. Attach IRBManager Protocol Form.

IRB Form Protocol Form

Download and save the IRBManager Protocol Form. Complete and attach in Section Y1.

Y2. Recruitment Materials - Including flyers, advertisements, recruitment scripts, emails, etc.

No answer provided.

Y3. Complete and attach Consent/Assent form(s) and/or Waiver to Obtain/Document/Alter Informed Consent.

Consent Form - PBL
Guide Study.pdf

Combined
Consent/Assent Form
#1

Download and save Consent/Assent Forms.
Complete and attach in Y3.

IRB Paperwork (cont.)

Y4. Data Collection Instruments - Survey/Interview questions, chart review data collection forms, etc.

PBL Guide Data Collection Instrument #1
STUDENT SURVEY QUESTIONS.pdf Survey #1

Y5. Grant Application if Federally funded

No answer provided.

Y6. Institutional Permission or other IRB Approval. If multiple IRBs are involved and an IRB Agreement has been requested/approved, attach correspondence (e.g., email from IRB).

No answer provided.

Y7. Other Documents that may be important for IRB review.

No answer provided.

Z. Assurances

IRB Paperwork (cont.)

Z.1 As Principal Investigator or Student Principal Investigator, I certify the following:

- a. I have reviewed this protocol submission and acknowledge my responsibilities as Principal Investigator. *All must be checked.*
- b. The information in this submission accurately reflects the proposed research.
- c. I will not initiate this study until I receive written approval from the IRB.
- d. I will promptly report to the IRB any unanticipated problems and adverse events, as well as any findings during the course of the study that may affect the risks and benefits to the subjects.
- e. I will obtain prior written approval for modifications (amendments) to this protocol including, but not limited to, changes in procedures.
- f. I have completed the UWM Human Subjects Training Module.
- g. I have determined whether or not I am accessing protected health information as part of my proposed research, and if so, I accept responsibility for assuring adherence to HIPAA.
- h. If I am using PHI in my research, I have visited the UWM HIPAA Training website (www.hipaa.uwm.edu) and have completed all required training, and I am complying with HIPAA's requirements for researchers.
- i. I accept responsibility for assuring adherence to applicable Federal and State research regulations and UWM policies relative to the protection of the rights and welfare of the subjects enrolled in this study.
- j. I understand that the UWM IRB operates under a Federal Wide Assurance (FWA) from the Department of Health and Human Services.
- k. Unless given Exempt Status, I understand that this study is subject to continuing review and approval by the IRB.

IRB Paperwork (cont.)

IMPORTANT Information about submitting this form:

- If you are the author of this form and would like to share it with co-investigators for editing/reviewing BEFORE submitting, please use the "Collaborators" option at the top of this page. The "collaborators" will receive an email with a link to this form and will then have the ability to review and/or edit the submission.
- To submit the form, select the "Sign" box below. You will then be requested to enter your user name and/or password to indicate that you have read and understood the above assurances. After you enter your password, you will need to select the "Submit" box on the next page to complete your part of the submission process. When you receive a message that the form has been submitted, you have properly submitted the form.
- If you receive an error message when signing off on this form, please try changing your web browser. If you still receive an error message, please contact the IRB Office (irbinfo@uwm.edu or 414-229-3173 or 414-229-3182) and provide us with the date/time of the error, the browser you are using, your name, and the study title.
- If you are not the PI of this study, after you submit the form the PI will receive an email notification requiring him/her to review the submission. The PI has the ability to either approve and submit the form to the IRB or reject the form back to you for revisions. The PI will receive weekly reminders about this form, until the PI submits or rejects the form. The IRB recommends you also communicate the PI's role in the submission process to ensure the process is completed.

Signed Saturday, September 7, 2019 1:08:46 PM ET by Cosier, Kimberly

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Billy Goat (2020.4.4421.0/Release/ca7ed60) | GCWAWS1 | 2020-04-14 19:22:34Z

Powered By  IRBManager

Appendix H - IRB Approved Survey Questions

Question 1:

If you were required to do a large project without this guide, but you were still required to document your process from beginning to end, do you think it would be easier or harder?

Easier
About the Same
Harder

Question 2:

I feel that the PBL Guide helped direct me through the steps of documenting and organizing my project from beginning to end?

Strongly Agree
Agree
Neither Agree, Nor Disagree
Disagree
Strongly Disagree

Question 3:

I feel the PBL guide helped improve my final product?

Strongly Agree
Agree
Neither Agree, Nor Disagree
Disagree
Strongly Disagree

Question 4:

I think the PBL guide would be helpful for projects in many different content areas? (ie, fine art, design, engineering, woodworking, etc.)

Strongly Agree
Agree
Neither Agree, Nor Disagree
Disagree
Strongly Disagree

Question 5:

What was the most useful part of the PBL Guide? Why?

Question 6:

Were there any parts of the PBL Guide that seemed confusing or unnecessary?

Question 7:

How would you improve or change the PBL Guide to make it work better for you?